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## Strawberry Culture

by T. J. Talbert

University of Missouri

**T**HE STRAWBERRY is the most valuable of the small fruit crops grown in the United States. It is also more widely grown than any other kind of fruit. For more than six months each year, strawberries may be found upon the principal markets of the country.

Every community in Missouri can use the product of from one to 10 acres of strawberries locally. This fruit is not as generally grown in the home vegetable garden as it should be, and comparatively few counties in the state furnish berries for the local markets and supplies for markets outside the state. In most communities, therefore, there is an opportunity for some good grower to supply berries for local demand at remunerative prices.

According to the United States Department of Agriculture, the average yield of strawberries per acre for the whole country is about 1800 quarts, valued at \$150 to \$200 per acre. The yield in southwest Missouri in 1923 was 800 cars and the estimated production for the same region for 1924 is 1000 cars. There is probably no crop that will produce more dollars per acre than the strawberry; however, no one should attempt to get rich-quick by planting 100 acres the first year. In such a case, failure would be almost certain.

The strawberry is an especially good crop for the home garden. It is adapted to a wide variety of soils, and it is comparatively free from injurious insect pests and plant disease. The plants rarely require spraying. The crop is suited to the garden rotation, may be planted at a small initial cost and will bring quick returns and large yields.

The record of strawberry production compares very favorably with the production of other crops; yet, on the same acreage now under cultivation in Missouri, the yield could be doubled with increased profits by putting into practice better cultural methods. It is important that the acre yield be in-

creased and the cost of production decreased.

### Soils and Location

The strawberry has a wide range of

varieties do better on light, sandy, gravelly or stony soils than on clay, heavy or wet soils. New land is often preferred because of increased yields,



A strawberry field mulched with wheat straw.

adaptation to soil and climatic conditions. It is a well known fact that this fruit will thrive, if given proper care and attention, upon any soil suited to the production of farm crops. In many instances, growers maintain that they secure larger yields from strawberries on poor soils than they do from grain crops. In general, most

fewer weeds to fight and less cultivation required. A well drained, fairly light, moisture holding, medium fertile soil is generally desired for best results.

The soil and location will influence to some extent the early spring growth and time of harvest. A light, sandy or stony soil with a southern exposure

will produce earlier fruit than a heavy, moist soil with a northern exposure. Low lands without good air drainage are not as well suited for strawberry production as higher ground with good air drainage because the crop on the low land is more liable to frost injury than the crop on higher ground where late frosts are less likely to occur and where air drainage is usually better.

### Improving the Soil

Strawberries draw heavily upon the soil moisture in maturing a crop. By plowing under barnyard manure and such leguminous crops as cowpeas, soybeans, clover or alfalfa, humus and nitrogen are added to the soil. Non-leguminous crops like wheat and rye may also be plowed under for the purpose of building up the water-holding capacity and humus content of the soil. In most cases, it is perhaps more important to loosen and aerate the soil and increase its water-holding capacity than it is to add fertility in the form of nitrogen. The materials plowed under act like a sponge in holding water and making it available when the plants need it.

Clover, timothy, blue grass and other sod lands are apt to be infested by white grubs which injure and destroy the roots and crowns of the strawberry plants by feeding upon them. It is usually safest, therefore, to grow corn or wheat on sod lands for the first one or two years after plowing in order to destroy the white grubs.

### Selection of Varieties

There are many varieties which are cosmopolitan and may be grown successfully over a wide area. Other varieties are restricted to certain sections or localities. Of the 1800 or more varieties of strawberries, relatively few of these are adapted to any one combination of soil, climate, methods of growing or marketing conditions.

In the strawberry growing districts of south Missouri, the leading commercial

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General view of a Missouri strawberry field on May 23.



Strawberries as an inter-crop in a young peach orchard.

# Are Insects and Disease Changing in Virulence?

by C. E. Durst

**A**RE THE insects and diseases of our fruits changing in virulence, and are such changes, if they occur, responsible in part for the changes in spray materials which we make from time to time? Such questions have been asked by more than one person, and they have been thought of by others who have not expressed their views.

When lime sulphur solution was first brought into general use, it seemed to be an excellent material for combatting San Jose scale and many experiment station men and practical fruit growers were pretty well satisfied that the control of scale was a settled proposition, provided the material was properly applied and prepared.

Within the past few years, however, we have heard a great deal about lime sulphur not controlling the scale. Of course, some parties have contended that this was due to improper preparation of material, too weak material or lack of thorough application. However, some of the best growers in the country have insisted that they prepared and applied the material properly and yet failed to keep the scale within reasonable check. Evidence of this kind is so strong that it cannot be doubted.

## Cold Winters Aid in Killing Scale

Now, in connection with San Jose Scale, we must take into account another matter. Previous to the past winter we had two or three mild ones. Entomologists tell us that the increase in scale infection has been due in part at least to these mild winters. In fact, some say that we have been giving credit right along to lime sulphur for

killing many scale that were really destroyed by the cold winters. In other words, the cold winters have killed part of the scale and lime sulphur has killed a part, and together they have held the scale in pretty good check. With cold weather lacking the past two or three years, practically the only scale killed were those destroyed by lime sulphur.

Even allowing for all of these factors, however, some people question whether lime sulphur is controlling the scale as well as it did a few years ago. Can it be that we are not preparing the material as well as we did? This is probably not the case, in fact, we are very likely preparing the material better now than we did when lime sulphur was first brought into use. Our fruit plants are not changing in susceptibility, for there is no way by which such changes in asexually reproduced plants can be accounted for on a scientific basis.

The same question has been raised from time to time in connection with other insects and with many plant diseases.

When this question is considered from the standpoint of heredity, it seems at least worth serious consideration.

We have all heard of differences in the virulence of human diseases. In some typhoid epidemics, the disease is quite virulent, while in others it is of a mild nature. The same conditions have been noted the past few years with reference to the "flu," the virulence of which has varied in dif-

ferent seasons in the same community, and in different communities during the same season. Many doctors and other scientists believe that such things are due to differences in virulence of the particular colonies of disease germs which happen to start the disease in a community. Some diseases which years ago were quite serious are now regarded as of secondary importance. This may be due in part to the development of greater resistance in people, but it may be due also to changes in the virulence of the diseases.

## Differences in Hereditary Constitution

Variability is universal among plants and animals. No two organisms are exactly alike, even though of the same breeding. The variations are partly due to such things as differences in soil, climate, food, moisture, etc., but in most cases they are due also to differences in hereditary constitution. It is the variations due to differences in hereditary constitution that concern us in this connection.

Within practically all our varieties of plants and breeds of animals, there are numerous lines which differ in hereditary constitution. For instance, some families of people are larger, stronger, more intelligent, or more flat-footed, than others. In domestic animals, the great advances made in increasing the size of horses, hogs, etc., are due to selection and breeding from the larger individuals. In plants we see numerous differences in size, productivity, disease resistance, abil-

ity to extract food from the soil, etc. The great achievements of our plant breeders are due to selection and breeding from these superior types.

Now, if our higher plants and animals show hereditary differences in many or all of their other characteristics, then we would expect insects and diseases to vary in their ability to attack higher plants and animals and in their susceptibility to spray materials.

Returning now to San Jose Scale, it is possible that when we began spraying for scale, we first destroyed the hereditary lines which were most susceptible to lime sulphur. Those remaining had higher resistance on the average, and it follows that we unconsciously may have been encouraging the propagation of the species from the lines which possessed the greatest resistance to lime sulphur.

## Do "Sports" of Insects Possess Increased Resistance to Lime Sulphur?

Another important fact must be taken into consideration. All of our higher plants and animals throw "sports" occasionally. There is every reason to believe that "sports" occur among insects and diseases. No doubt they occur with regard to such matters as virulence as well as in respect to form and shape. In view of the large numbers of insects and diseases and their rapidity of multiplication as compared with higher plants and animals, we would expect "sports" to occur among them in greater numbers. If a "sport" appeared which possessed increased resistance to lime sulphur, it would play an important part in

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# Dusting and Spraying Peaches

by W. C. Dutton  
Michigan Agricultural College

**T**HE PEACH crop in many of the heavy producing areas will be very short as the result of winter injury to the fruit buds. A few areas, however, seem to have escaped serious injury and the growers in these districts will probably find that their crop will be worth more money than during some seasons just past. Under these conditions it seems advisable that the grower should take every reasonable precaution to insure carrying the peaches through to the consumer in good condition and this, of course, means the control of the diseases and insects which might affect the fruit. The most serious of these are brown-rot, peach scab and curculio, and, fortunately, these may all be held in check in the northern districts by proper treatment.

## General Summer Treatment

Peach growers are generally familiar with the summer schedule of applications for the control of these pests but it may well be discussed briefly here. In the northern districts the schedule usually followed is about as outlined here.

First—When the last of the "shucks" or "husks" are falling.  
Second—About two weeks after the first application.

Third—One month before the fruit is harvested.

The first one is directed particularly at the curculio, the second at curculio, brown-rot and scab, and the third at brown-rot and scab, and sometimes curculio.

## Spray or Dust

The natural question for the grower to ask is, "What material shall I use?" The old stand-by for peach spraying is self-boiled lime-sulphur. This requires lump lime and it is frequently unobtainable, and even if he can get it, the grower does not like to make the mixture, and he cannot be blamed in the least for feeling that way. Fortunately, there are satisfactory substitutes for self-boiled lime-sulphur. Sulphur dust has given excellent control of the pests which affect the fruit and this method of application has several points in its favor. One of the most important of these is the fact that foliage injury seldom develops on dusted trees. Many growers do not have dusting machines and for their use is suggested one of the

recently developed mixtures of sulphur, hydrated lime and some spreader, such as, for instance, casein or skimmed milk.

The materials to be used for the applications noted in a preceding paragraph may be listed as follows:

## For Dusting

First—Sulphur, 80 per cent; lead arsenate, 10 per cent; hydrated lime, 10 per cent. This is frequently spoken of as an 80-10-10 mixture.

Second—Same as first application.  
Third—Sulphur, 90-95 per cent; hydrated lime or other spreader, 5-10 per cent.

Hydrated lime does not increase the fungicidal value of the dust but tends to prevent arsenical injury from the earlier applications and to make the sulphur lighter and fluffier for the last. If curculio is serious, the 80-10-10 mixture should be used for the third application.

## For Spraying

First—Lead arsenate, one pound in 50 gallons of water, to which has been

added two to three pounds of lime. Well slaked lump lime or fresh hydrated lime may be used.

Second—A sulphur-hydrated lime spray to which has been added one pound of lead arsenate for each 50 gallons.

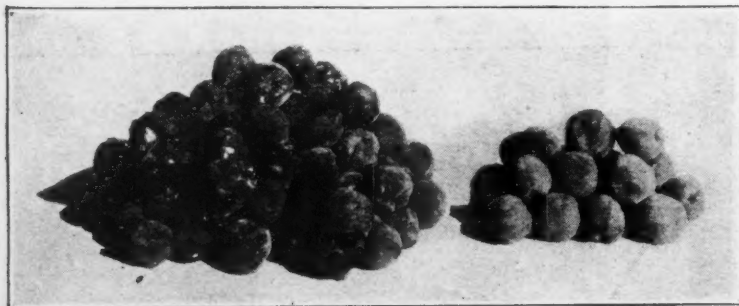
Third—A sulphur-hydrated lime spray. Lead arsenate may be omitted unless curculio is serious.

Dusting or spraying as outlined above should bring the fruit through to harvest in good condition and with some varieties further treatment may not be desirable, but with many varieties which are susceptible to brown-rot, a later application has been found to be of value.

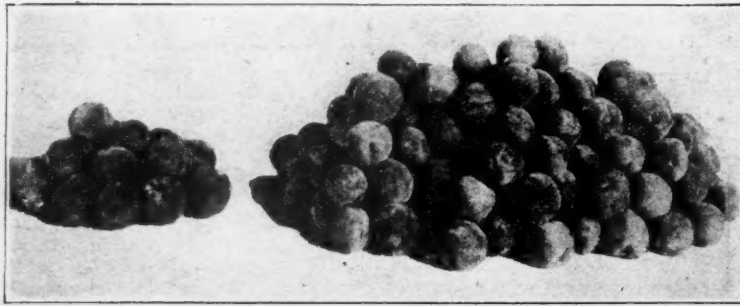
## Delayed Applications

Peaches may be picked and packed apparently in excellent condition, but that does not mean that they will reach the consumer in that same excellent condition. They may possibly decay before they are shipped, they may decay while in transit and reach their destination in an unmarketable condition, or if they have been shipped in well iced cars, they may reach the market in good condition but decay before reaching the consumer. The trouble which is usually responsible

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Peaches from trees which did not receive the late application of sulphur dust. Eighty-two per cent of them were affected with brown-rot four days after picking.



Peaches from trees which received the late application. Only 10 per cent of them were affected with brown-rot after four days. The variety was Wark, which is very susceptible to brown-rot.



# The Inside Story of the Apple

## Part V.—The Development of the Fruit

by J. R. Magness

United States Department of Agriculture

**T**HE IDEAL toward which the apple grower should strive is a regular crop of medium to above medium-sized apples, of the highest possible quality, each season. To secure this ideal, it is first of all essential that fruit buds be formed each season, and that these buds develop strong flower clusters capable of setting fruit; that conditions be right for pollination to occur and fertilization to take place, and, finally, that the fruit once set be properly grown to maturity. In this discussion we will point out certain of the factors involved in the growth of the fruit itself between the time of setting and the time of full maturity on the tree.

In any discussion of the factors which enter into the growth of the apple, it is first of all essential to know the materials which go to make up the fruit and where these materials come from. While varieties of apples differ somewhat in composition, the average apple is made up about as follows:

From 83 to 85 per cent of the weight of the fresh apple consists of water, which must, of course, come from the soil; about 12 per cent of the weight of the apple consists of sugar and starch; about one-third to one-half per cent of most varieties consists of acid; while two or three per cent of the weight of the apple is made up of complex tissues which make up the cell walls, or the fiber, of the fruit. All of these substances, including the cell wall building materials, sugars, starch and acid, are composed of substances formed in the leaves from carbon dioxide and water, as we discussed in detail in the first of these articles. There are small quantities of proteins, or nitrogen-containing compounds, present in the apple. The substances of which these compounds are built, called amino acids, are also probably formed to a very large extent in the leaves. Finally, there are traces of all the mineral materials required for plant growth, including phosphorus, potassium, calcium, magnesium, sulphur and iron, present in the apple. These mineral materials are present only in very small amounts and are derived primarily from the soil.

Thus it is apparent that to a very large extent the materials, other than water, which go to make up the apple fruit are formed in the leaves. It therefore becomes evident at once that there is a very close relationship between the leaf area of the tree and the development and growth of apples on the tree.

### The Growth of the Apple

The increase in size of the apple is continuous from the time the blossom opens until the fruit is picked or falls from the tree. It seems probable, though this has not been shown experimentally, that if conditions within the tree, or within the fruit, become such that growth in size ceases entirely for some days, the apple will quickly drop off.

While the apples appear to be increasing in size very rapidly during the first few weeks after blossoming, the actual weight of the fruit tissues formed in any given length of time early in the season is very much less than that formed in a similar length of time during the last half of the growing season. Apparently it is after the main growth of the tree, in length of shoots at least, has ceased, and after the leaf area is fully expanded, that the greatest increase in size of the fruit occurs. This is after the first of July in most sections of the country. Consequently, the conditions prevailing in the tree from mid-June, or early July, until the end of the growing season, will largely determine the size the fruit will attain.

### Factors Affecting Rate of Growth of Apples.

The primary factors affecting the rate of growth of apples, and con-

sequently the total size attained by them, are, first, the quantity of apples on the tree; second, leaf area of the tree; third, available nitrogen in the soil, and, fourth, the amount of moisture in the soil. The total size attained by the fruit will also be influenced by the length of the growing season. It will be possible to discuss these factors only very briefly in this article.

The quantity of fruit on the tree will bear a direct relationship to the size attained by the individual apples. The quantity of fruit on the tree, the leaf area and the available nitrogen, are all intimately interrelated in determining the size which the fruit will attain. The leaf area of any individual tree will form only about a certain quantity of sugar and starch. While the composition of the apple can be affected to some extent by a shortage of these materials, the main influence of a small supply of carbohydrate materials in the tree appears to be a cutting down of the size of the individual apples, rather than a lowering of the concentration of sugar and starch in the apples which are formed. We do not know how many leaves are required to manufacture the materials which go into an average-sized apple, but we do know that trees often produce such heavy crops that there is an insufficient amount of food material present to grow the apples to full size.

The fact that the growth of the fruit is limited by lack of the materials formed in the leaves may be shown by the effect upon the size of the fruit of girdling or defoliating certain branches. If a branch is girdled by removing a ring of bark, the removal of the bark prevents the materials formed in the leaves from passing out of the branch. If only a moderate number of apples are borne on the branch above the girdle these apples will attain very large size because of the abundance of material from the leaves in that region of the tree, even when the tree as a whole is bearing a heavy crop of small-sized fruit. On the other hand, removing a certain portion of the leaves from any branch, thus cutting down the food manufacturing area, will markedly reduce the size of the fruit on that branch.

It is thus apparent that there is a close relationship between the leaf area and the growth of the fruit. This relationship occurs not only within the tree as a whole, but even to a greater extent within individual branches on the tree. Any branch with a moderate number of apples and a good, vigorous leaf area, will grow those apples to good size if sufficient moisture is available, even when the tree as a whole is badly overloaded. On the other hand, the tree as a whole may have a very light crop and certain heavily loaded branches will produce only small-sized fruit. It is important not only that there be a sufficient leaf area in the tree as a whole per apple produced, but this leaf area must be in fairly close proximity to the fruit if good size is to be attained.

Thinning the fruit, thus reducing the number of apples being produced upon any tree, without reducing the leaf area, is the only way to secure good size in apples on trees that are bearing very heavy crops. It can very readily be seen that the thinning should be distributed over the tree as a whole, giving the best possible distribution of the fruit in relationship to the leaf area if best results are to be secured. The earlier the excess fruit can be removed from the tree the better, since the materials which have entered into the fruit which is picked off are a direct loss to the tree. Inas-

much as the main growth in the fruit occurs after July 1, however, it would seem that in most regions this would be a sufficiently early date to complete the thinning operation.

The available nitrogen in the soil appears to act in two ways to stimulate growth in the fruit. Of very great importance is the fact that an abundance of nitrogen stimulates wood growth in the tree and thus increases the leaf area, as was pointed out in the first of these articles. It may be that this is the main influence of nitrogen on the size of the fruit, although it is probable that it also acts directly on the fruit to cause increased growth. Whatever the true explanation, the fact is well established that a fairly abundant nitrogen supply will greatly increase the size of the fruit.

The amount of moisture in the soil also exercises a great influence upon the rate of growth of the apples. Again, the exact mechanics by which this result is accomplished are not known. All the processes which go on in living plant tissue are carried on in the presence of water, and it is probable that a low water supply, with a tendency to wilting in the leaves, greatly reduces the activity of the leaves. Also, the materials from the leaves must be moved to the fruit in solution, and this movement may be greatly hindered by low water supply to the tree. The presence of a sufficient amount of water in the soil is essential to the development of proper size in the fruit.

The length and temperature of the growing season are also of much importance in determining the final size attained by many varieties of apples. Such varieties as Winesap, Yellow Newtown, Rome Beauty, Ben Davis and many others, require a long season of growth if full size is to be attained. Consequently such varieties will usually not attain large size if grown in northern districts of relatively short and cool growing season. This is a consideration which to a considerable extent determines variety adaptability to a given region. The fruit grower can exert no control over this factor, but can only select those varieties for planting which will reach full size and development under his climatic conditions.

### The Development of Wax on Apples

Of much importance to the fruit, particularly from the standpoint of storage quality is the development of wax on the skin. This waxy substance, which may be scraped off with a knife, forms mainly during the latter part of the growing season, and is primarily important in preventing the wilting of the fruit following its removal from the tree.

When the apple is young, the skin is covered with fine hairs, and there is little of the wax, or cutin, present. As the fruit develops, however, these hairs disappear and the wax forms over the surface. While the formation of this wax has not been studied as carefully as it should be, it appears to develop to the greatest extent on fruit exposed directly to strong sunlight and very dry conditions. Thus it is thicker on the sides of the apples exposed to the sun—the bluish side—than on the side protected from the sun. Similarly, apples entirely shaded from the sun appear to have less wax than those grown on the more exposed parts of the tree. It appears that apples grown in very dry, hot districts have more wax than those grown in humid regions of less sunshine.

When exposed to dry conditions following removal from the tree, fruit with the least development of wax

will wilt much more quickly than that with a heavy coating. The smooth wax covering is almost impervious to the passage of water out of the fruit. It is very apparent in apples which are beginning to wilt that the unblushed side shows evidence of wilting while the blushed side is still plump and firm.

Russetting, which is a characteristic of some varieties, and which may be caused by slight injury to the skin in many other varieties, apparently consists of the formation of corklike cells beneath the wax layer. These cells break up the wax layer and make the apple much more susceptible to water loss. For this reason russeted varieties, and apples of other varieties which have for some cause become russeted, tend to wilt rather badly following removal from the tree.

### Development of Color

The changes in color of apples as they develop on the tree are twofold. In the uncolored, or green, varieties there is a gradual change in the green color from the dark, or leaf, green to a very light, or yellow, green as the fruit matures. A similar change occurs in the shaded portions of the red, or bluish, varieties. Secondly, there is the development of the red color in many varieties which is of such great importance to the appearance of the fruit and to its attractiveness on the market.

The development of the red color on apples occurs mainly during the latter part of the growing season. The chemical changes involved in the formation of the red color have never been accurately determined. From observation and some experimental work, however, we know the conditions under which color apparently reaches its highest development.

Of primary importance to the development of red color in apples is direct and intense light exposure. Intense light for at least part of the day seems necessary to the changes taking place in the skin of the fruit which produce the red pigment. Even a leaf lying over the surface of the fruit will prevent color development in most varieties. Bright sunny days appear essential.

Another requirement for high color development is, apparently, cool nights. A low temperature for part of the time at least seems greatly to aid the color development. The combination of cool nights with high light intensity is ideal for color development. Thus we find fruit grown at high altitudes is usually much more highly colored than that grown at lower altitudes, where there is less sunshine, and where there is less daily range in temperature. Also, we find that fruit grown in the arid districts of the west, where high light intensity is coupled with low night temperatures, takes on a very high color and finish.

Any treatment which tends to reduce light intensity will tend to reduce color development. Thus nitrogen fertilizers, which stimulate growth of the leaves, and thus result in denser shade, will almost invariably reduce the amount of color on the fruit. Fruit grown in non-fertilized sod orchards, which generally do not have dense foliage, will usually be highly colored.

It is not essential that apples be attached to the tree to develop color, in fact, in many cases, they appear to develop color even faster following the removal from the tree than while attached, provided they have a similar light and temperature exposure. Under commercial handling conditions, however, apples will usually be removed from direct light exposure shortly after picking, so that it may be considered that red color development ends with picking.

The change in the green color from leaf green to yellow apparently is independent of light exposure. It represents one of the best measures which

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## Federal Regulations for Cider and Vinegar

**M**ANY of our readers have written us from time to time regarding the Federal Prohibition Laws in reference to the manufacture of cider and vinegar. This is a very important subject at this time so we feel that a reprint of the regulations will be appreciated by all fruit growers. This information is complete and authentic and covers the March, 1924, revision.

Regulations No. 60, United States Bureau of Internal Revenue, Pertaining to Manufacture and Sale of Cider and Vinegar, Revised March, 1924. Copies of complete Regulations No. 60, Revised March, 1924, may be obtained from the Federal Prohibition Commissioner at your State Capital, or from the United States Bureau of Internal Revenue, Washington, D. C. We quote below, in full, Sections 610, 618, 630, 631 and 680.

Section 610, Page 63. Home manufacture of nonintoxicating cider and fruit juices.—Under Section 29 of the act, the penalties against the manufacture of liquor without a permit do not apply "to any person for manufacturing nonintoxicating cider and fruit juices exclusively for use in his home, but such cider and fruit juices shall not be sold or delivered except to persons having permits to manufacture vinegar." Any person, therefore, for use exclusively in his home, may manufacture cider and fruit juices which are nonintoxicating, without obtaining permit. Such nonintoxicating cider and fruit juices may be manufactured at the home in which they are to be used or the fruit may be taken to a custom or a commercial mill to have the juice expressed therefrom, provided, in the latter case, the juice is promptly removed to the home of the person for whom expressed. Fruit juice may not lawfully be used for beverage purposes after becoming intoxicating.

Section 618, Page 65. A permit and bond will not be required for the operation of a custom cider mill engaged exclusively in manufacturing cider from apples owned by others, provided the freshly expressed cider is promptly removed to the homes of the owners. Freshly expressed cider or apple juice taken as toll by the proprietor of such custom mill may be sold for immediate removal to the

homes of the purchasers, or it may be removed to the home of the proprietor. If the proprietor of a custom mill also engages in the manufacture of preserved sweet cider or cider vinegar, he must obtain permit and give bond.

Section 630, Page 65. Commercial Production.—A person desiring to manufacture preserved sweet cider under section 4 of Title II of the act, or cider or other liquid or liquor specified in this article for conversion into vinegar, or to use such cider, liquid or liquor in the manufacture of vinegar, or to sell same to a vinegar manufacturer, should file application on Form 1404, as prescribed in Article II, setting forth in such application the acts for which authorization is desired. If such application is approved, a permit will be issued authorizing the acts stipulated in the permit.

Section 631, Page 66. Preserved sweet cider may be manufactured under permit issued as provided above, and when manufactured and prepared for the market may be sold without further permit. The process of preservation shall be adequately described in the application. A method of preserving by pasteurization and bottling in closed sterile containers is generally recognized as efficient. Pasteurized cider may not be sold or delivered in bulk containers, such as kegs, barrels, etc. (except to a vinegar maker, pursuant to Section 685).

Section 680, Page 66. Vinegar.—Vinegar exclusively for use in the home of the manufacturer thereof may be manufactured from cider and other fruit juices, without permit, as provided by Section 610.

## Special Factors to Consider in Planting an Orchard

**M**ANY things are to be considered before entering commercial fruit growing. Financial means is one of the most important considerations. Fruit growing does not offer immediate returns and one must have considerable funds available to carry out this project. An important factor to consider is whether or not your land meets the soil requirements for successful orchard-planting. Climatic conditions and marketing facilities must be carefully considered. When the above requirements are met, you may then consider the actual establishing of a commercial orchard.

Your first consideration will be the selection of nursery stock. In buying fruit trees one should deal with nurserymen of good reputation and who guarantee their varieties to be true to name. Only a few varieties should be selected for a commercial orchard and two points should be considered in this selection, namely: Are the varieties adaptable, and will they fruit well in your locality? Are the varieties selected well known and demanded on the market? The number of varieties selected will depend on whether or not you are catering to a local or central market. If catering to the latter, fewer varieties should be selected. The purchaser should specify the age tree he desires. One-year-old peach and apple trees have been found to be most desirable among commercial growers all over the country.

When the nursery stock arrives, the purchaser should personally inspect the stock, noting the size and maturity of the tree and observing very closely to determine if any San Jose scale, woolly aphis, crown gall, nematode or other diseases are present. This inspection is the best insurance that you can ever give your orchard. After a thorough inspection has been completed, the stock should be carefully heeled in to prevent drying out. From here they should be taken directly to the orchard and planted without delay of any kind. Check your varieties to see that no substitutions have been made without your permission.

It is desirable to prepare the land well in

advance of planting it to an orchard in order that it be in good physical condition. If the land is reasonably fertile, well drained and in good physical condition it will give the newly placed trees an opportunity to quickly establish themselves. Land newly cleared should be cultivated at least two seasons before planting to an orchard. In planting the new ground, one not only has the inconvenience of stumps and underbrush to deal with but there are certain root-rot diseases affecting forest trees that are associated with the root-rot of the apple.

There is a difference of opinion as to whether fall or spring planting gives the best results. The fall planted tree gets established better and grows off more readily in the spring, but one should not delay the planting of his orchard a whole year because he failed to get his land in shape in the fall, for spring planting in many instances has been successful.

Apple trees should be planted 35 to 40 feet each way to prevent crowding in the future. There are a few upright varieties such as the Yellow Transparent and Yates that would not require quite this much distance. Planting trees too close has been a serious error on the part of many orchardists. The two most popular distances for planting peach trees are 18 by 18 or 21 by 21.

After the orchard has been laid off according to the desired distances, the hole which is to receive the tree should be dug. It should be wide enough to allow the roots a full spread and deep enough so that the tree will set a little deeper than it stood in the nursery row. It is important to sift the fine top soil about the root system without getting the roots matted together from the pressure of the soil. The soil should then be tamped. After the hole is filled, a second tamping should take place, loose soil should be drawn up about the tree a little above the level so that when the soil about the tree settles it will not be in a low place.

Use of fillers in most cases is misuse of fillers. A filler is a tree that will mature early, bear a few crops and then be removed. The idea of fillers is to lower the cost of bringing an orchard into bearing and at the same time retard it in no way. Few orchardists have the courage and will power to remove these fillers, which in the end will greatly crowd the other trees. It would probably be better to grow field crops instead of using fillers. In selecting a suitable field crop, always select a low growing one, preferably one that will enrich the soil and not interfere with the spraying operations.

## Prizes for Pictures

**I**N THE month to come, we shall publish some very interesting articles which will refer to the home of the fruit grower. We shall in these articles refer to the mode of living of the fruit grower and we want some good photographs, showing the interior and exterior of his home. We would like some photographs showing a typical home of a fruit grower, photographs showing a bathroom, a kitchen, in fact, interior views, these photographs to be used at some future date in our editorial page.

We are going to offer prizes for the best photographs.

First prize ..... \$25.00  
 Second prize ..... 10.00  
 Third prize ..... 5.00

Photographs may be sent in until August first, at which time a selection will be made of the three best photographs.

In addition to these prizes, \$1.00 will be given for photographs that can be used by us in the different phases of our work. We hope all of our readers will take an interest in this contest and will send us exterior and interior views of their homes.



# Growing Nursery Trees

by M. J. Heppner

University of California

VERY few orchardists in California grow their own trees but instead rely upon the nurserymen of the state to supply their needs. The quality of the trees that are produced and the reasonable rates at which they are sold make it uneconomical for the average orchardist to raise his own trees. During the year 1922, California nurserymen propagated well over 10,000,000 deciduous fruit trees as was shown by a survey made by the writer. When planted in orchard form, these trees represent approximately 125,000 acres in fruit. Despite the fact that most growers buy their trees from nurserymen, there are many growers, who for some reason or other, prefer to propagate their own trees. It is the object of this paper to give a brief treatise on how to propagate deciduous fruit trees.

## Soil Must Be Good

One of the first requisites for a good nursery is that the soil be of the best type. A loamy soil with good drainage is preferable; one that can be easily cultivated. As will be pointed out later, frequent cultivations are necessary in successful nursery work. Utmost care must be taken in selecting a location where there is no chance for standing water to cover the ground. It would be disastrous should there be water on the surface of the ground at the time the trees should be lifted for permanent planting. In case the grower does not have a good loamy soil present, but, instead, one of the heavier types, such as a clay or adobe soil, it will pay him to treat the soil the year before in such a manner, by repeated cultivation or liming, so as to improve the condition of the soil. Observations have shown that better results are obtained when the soil has been previously devoted to field or garden crops. If possible, newly cleared land should not be used for a nursery.

The spot selected for the nursery should be one of good exposure and free from cold winds. Low pockets should be avoided due to the hazards of frost occurring in them. In order to get good growth in the seedlings there must be an abundance of sunshine.

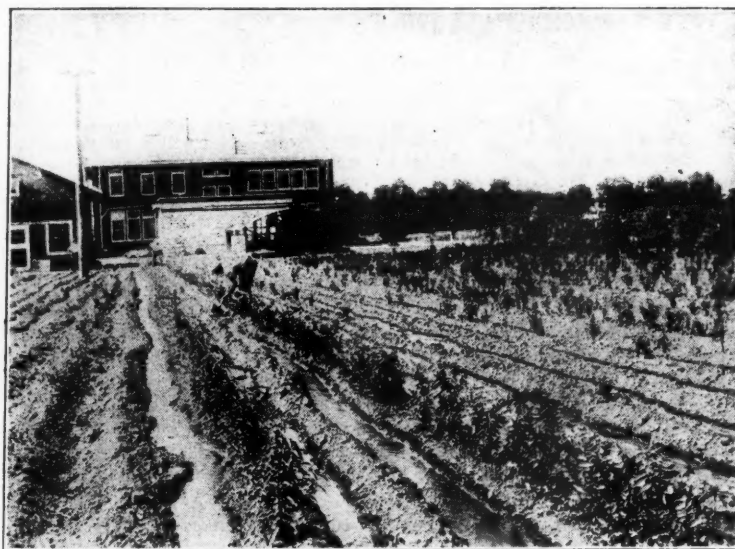
A grower contemplating establishing a nursery should select the location the year previous to when he expects to set out his seed, and put in some cultivated or hoed crop. By putting in such a crop, the ground will be cultivated or hoed repeatedly and thus be worked down to a fine, pulverized condition. During the winter preceding the planting of the nursery, all the greens remaining from the crop should be turned under. This should be followed by another plowing and a harrowing in the spring. By this time, the soil should be in a good working condition and ready for the pits.

## Caring for the Seeds

Before the pits are planted in the

nursery row they are generally given a previous treatment of stratification. As a rule, the seeds are obtained from dry yards, or canneries. Whenever possible, the pits should be taken from vigorous trees, this being practical only when a few seeds are desired.

and harrowed down to a fine condition. The rows are next laid out as straight as possible with some type of implement. A small plow furrow gives very good results, but in cases where only a few hundred trees are to be propagated, a hand hoe will be



In order to keep nursery trees in a thrifty growing condition, it is necessary to apply water at frequent intervals. The common practice in California is to irrigate by using furrows.

One must take caution not to allow the seeds to dry out and thus prevent germination. This is done easiest by placing some sand in the bottom of a box about four inches deep and then

found useful. The distance between the rows depends upon the type of soil and ground available for the nursery. It generally varies from four to six feet, the former being pre-



Showing rows of apricot seedlings four weeks after planting seeds in nursery row. These seedlings will be budded this summer.

spreading the pits over the sand. The pits should be covered with another layer of sand and the entire contents kept damp, but not wet. When using large amounts of seeds, pits are often dug in the ground and the seeds buried until time for planting. During the winter months, it is a good policy to keep the box under the eaves of a building where it can get the run-off from the roof. Although there are several different methods in use for caring for the seeds until time of planting, the above method is about the easiest and generally as successful as any of the others. If the seeds are given the proper care, they will have sprouted by the following spring.

## Planting the Seeds

In early spring the ground is plowed

ferable where the area of ground is limited. After the rows have been opened up, the sprouted seeds are planted. This is done by hand if sprouting has already occurred. However, in large nurseries a seed planter is generally used. When this is used, the seeds must show no evidence of germination. The depth of planting depends upon the size of the seed and the character of the soil. Care must be exercised in not getting the seeds too deep or too shallow. The seeds are planted about four to six inches apart and sometimes even closer.

After the plants appear above the surface, the ground should be cultivated sufficiently to keep down weeds and also to keep the soil in a good condition. Where irrigation is neces-

sary, care must be exercised not to give too much water as this often makes very succulent-growing seedlings.

During the summer months, the trees should be watched for insect infestation. Although it does not happen very often, a serious infestation may occur, thus necessitating control measures. As a rule, the red spider causes the most trouble in California.

About two or three weeks before budding, the seedlings should be stripped of their lower branches up to a point about four inches above the surface of the ground. This is done so as to give the lower end of the seedling a smooth working surface free from interfering branches. At the same time, the seedlings should be thinned out where they appear to be too close together. This will not be necessary when the seeds are planted about six inches apart.

## Budding of Nursery Trees

Most of the budding of nursery trees in California is done from July to October. Some budding is done during June, giving rise to what is termed "June buds." The time of budding depends upon three things: First, the securing of the buds for budding; second, proper slipping of the bark of the seedling; and third, seedling of sufficient size. It is a common practice to irrigate about 10 days before budding. An irrigation at this time makes the bark slip more readily.

Practically all deciduous fruit trees are budded by using the common "T" bud. The process of making this bud is simple and is as follows:

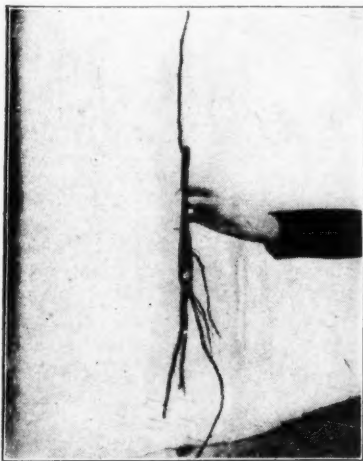
Shoots of current season's growth are taken from the desired trees and cut into lengths convenient to handle, usually about 12 inches. The leaves are cut off, leaving about one-fourth inch of the petiole to be used as a handle during the budding operation. These shoots are generally called "bud sticks" and should always be kept wrapped in a damp sack to prevent excessive drying out.

After the "bud sticks" are obtained, the budder is ready for the actual budding operation. Before starting in, he should be sure his knife is sharp, as it is very essential that clean cuts be made when budding.

The bud is generally inserted at the north side of the tree in order to protect the bud from the direct rays of the sun.

A spot on the tree as near the ground as is convenient to work is selected and a vertical cut about one and one-half inches long made into the bark. A horizontal cut about five-eighths of an inch in length is then made across the top of the first cut, completing the "T." The two flaps are then opened and the matrix is ready to receive the bud. In order to remove the bud from the "bud-stick," the knife is inserted into the bark about one-fourth inch below the bud.

(Concluded on page 11)



A "June budded" walnut tree. Note point to which original seedling was cut.



Showing four weeks' growth from bud inserted last August.



# Development of Motor Truck Transportation

by L. T. Robinson

IT WAS one of those listless summer Sundays when the country sleeps in a warm drowsiness broken only by the whirr of motor traffic along the highways. At the edge of one of the white ribbons of traffic, not more than 20 miles from a large city, the front lawn of a farmhouse was decorated with an ancient and bespattered vehicle—one of the early vintage of motor trucks—heaped high with home-grown watermelons.

Now and again passing motorists pulled aside and stopped to quench their thirsts with a roadside repast of melons, eaten au naturel. The farmer spent his afternoon cutting melons and transferring silver to a well-worn purse.

Later in the afternoon, a shining big motor car drew up by the roadside at a signal from the firm, clear-eyed man in the tonneau to the liveried chauffeur at the wheel. With evident relish he tested one of the melons.

"Have you many of these to sell?" he asked the farmer.

"Well, I hadn't figured on selling any except what few I can get rid of here on Sunday," was the reply. "You see, there isn't much market for watermelons that are home-grown and I planted some, just because I like them. They did extra well and we've a good many more than we can use."

"Well, how many have you?" again queried the man in the car.

"Oh, I reckon there must be 1200 or 1500 up there in the patch."

"What do you want for them?"

"Ten cents apiece."

"Will you deliver them all for that price in the city?" asked the customer.

"Yes, sir."

"All right, here is my card. Deliver

all you have to my wholesale house beginning tomorrow. You will get your check as soon as they are counted."

The farmer himself told me about it. The peculiar twist to the story was that the gentleman in the car was S. S. Kresge, the five and ten-cent store magnate, and he sold the watermelons as a "leader" in all of his Detroit stores for the same price that they cost him.

The significant thing for the farmer was around \$150 additional income—

And underneath it all was the fact that both buyer and seller were in reality dependent upon the battered old motor truck that stood in the yard on Sunday, but was eating up the miles between farm and city with loads of melons on Monday, Tuesday and Wednesday.

Call it an exaggerated case if you like, but the fact remains that it is a concrete instance of the productivity of a motor truck upon the farm. Certainly there could have been no bargain without the truck. However, the other fruits of that farm were transported; whatever nicely fitted arrangements were made for carrying the bulk of its output, none of these would have been available on the instant for the "extra" job. And as all business men know, fruit farmers included, the little extra profits many times swell the total to an appreciable degree.

Quite aside from that, however, is the fundamental change that is taking place today in the method of transporting all commodities of our country. Strongly entrenched as we have

been in railroads, with more trackage than any other nation in the world and with a higher efficiency of tonnage per mile of track—we already are beginning to realize that the possibilities of commerce within our own limits are almost boundless. Thanks to the new and flexible method of transportation with gasoline propelled vehicles operating on roadways.

## Passenger Car an Integral Part of Our Social and Economic Existence

With scarcely two decades of history behind it, the passenger automobile today has become an integral part of our social and economic existence. We have about one motor car for every three persons in the entire United States and better than one motor car for every family. It has changed our methods of transacting business; it has changed our recreations, our education and our very channels of thought. Pause for a moment and consider the passenger automobile. Were it wiped out tomorrow we would be lost—for a time at least—cut off from many essentials to our daily livelihood, if not from some necessities themselves.

Particularly is this true with the farm population. It is almost hackneyed to point out the factor which the motor car has become in the farm life of America. Everyone is familiar with the changes in farm life that it has brought—recent changes, too, because the farmer has been conservative always in his adoption of new means and methods. He has always waited until they have stood the test

of experiment at the hands of the urban sections of the country.

This same situation exists today with respect to the motor truck. And in viewing the status of this "motor beast of burden," we must never lose sight of the fact that the motor truck is a little brother of the automobile. It was born after the passenger car, developed in a little sphere of its own and more slowly than the automobile. It has been retarded in growth by all of the ailments of its elder kinsman, plus a more or less concentrated neglect on the part of its parents, so busy have they been in developing the passenger vehicle. In consequence, the motor truck was several years in development, so far as public acceptance of its value was concerned, when the assassins' bullets in Serbia started the world war.

## Motor Truck Comes Into Its Own

It was the war that brought the motor truck into its own and placed its abilities, its utility and its real value before the public. Of course, long before that time, a number of manufacturers were successfully engaged in building motor trucks—successful because they were able to market their output yearly to the business men of the country. But, in reality, they were selling to the adventure; to the pioneers who were willing to lay aside the customs of yesteryear and try the new. The experiences of the early motor truck users were being translated yearly into improvements in the next year's crop of trucks. Manufacturer and buyer alike were learning.

The venturers in motorized hauling were, for the most part, city haulers.

(Concluded on page 20.)

# Lime Materials for Soil Improvement

by Robert Stewart

University of Nevada

LIMEING the land for soil improvement is a very old practice. The practice was discussed by the Roman agricultural writer, Cato, in 200 B. C. It was practiced by the early German and English farmers when the Roman legions invaded Gaul and Britain. Its use has periodically grown and declined in England since that time. In America the use of lime has been practiced by the German farmers of Pennsylvania for many years. The use of lime in all these countries and in older times was limited to those regions where there was a cheap source of available material, such as chalk or marl, readily available for intimate mixing with the soil. The use of lime materials was also based upon entirely empirical ground and no definite explanation of the benefit of its use was offered.

With the growth and development of the experiment stations, more accurate knowledge became available regarding the lime materials available for use and their action on the soil and crops grown. During the past 20 years, the use of lime materials for soil improvement has grown enormously in the United States as indicated by the fact that 181,890 tons of hydrate of lime, 209,157 tons of burnt lime and 1,091,918 tons of ground limestone were produced for agricultural use in 1918. Lime material for soil improvement is used in 38 states of the Union.

There are a few regions, such as those near the chalk deposits of Eng-

land or the greensand marls of New Jersey, where the lime material is already prepared by nature for immediate addition to the soil. A few farming regions also are adjacent to shell deposits where the material can be easily converted into material suitable for soil improvement.

## Two Forms of Material Available for Soil Improvement

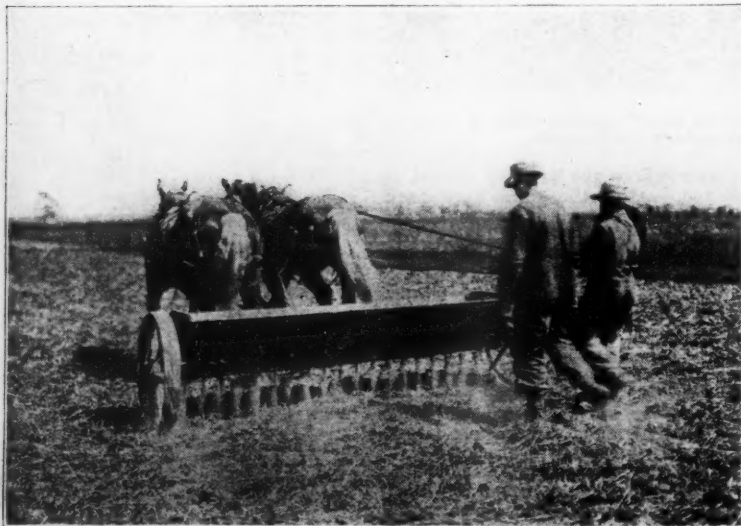
By far the greater part of farmers of the United States are dependent upon the natural occurring limestone deposits for material for soil improvement and use for correction of soil acidity. The limestone rock must be converted into such a condition so

that it can be intimately mixed with the soil. There are two ways in which this may be done: (1) By burning in a kiln to produce quick lime, which is then readily broken down either by air or water slaking into sizes suitable for mixing with the soil, and (2) by grinding the limestone with highpowered machinery sufficiently fine so that it may be mixed readily with the soil. The two principle materials therefore available for soil improvement are quick lime and finely ground limestone. Both of these forms are excellent material for soil improvement and the use of either one depends upon the comparative cost of the material to the user.

## Cost of Material

The initial cost of the two forms of material vary rather widely in

(Concluded on page 30.)



Method of applying limestone.



Effect of limestone on production of sweet clover on acid soil.



## Preparing for A Big Strawberry Crop

by L. R. Hesler

University of Tennessee

THOSE in the business of production at times forget, or wish they might forget, the factor of pests. It is not until the crop shows more than minor loss that attention is given to the diseases and insects which bother strawberries. Then, it is often too late to route the enemy, for he has already taken his loot and skipped. So, now that strawberry time is just passed for some of us, and just here for others, the whole list of problems in growing strawberries is fresh on our minds, and questions are a-plenty. If every plant we set grew; if every blossom made a fat, red berry; if every berry were healthy; if every plump, coveted fruit reached its shipping destination in perfect condition—then, Mr. Strawberry Grower could give the horticulturist, the bug-man and the plant pathologist the "ha-ha," he could say nothing against the transportation companies, and the bank account would indeed be a lovely sight!

But, all of these do not come as an out-and-out gift of Providence. He not only created the strawberry but He created pests, problems and punishment to make it a full measure; the idea seems to have been that something gotten for nothing would not be appreciated. The strawberry has its pests, and while not all of them can be told about here, nevertheless we can take a look at a few of the diseases, the rots, the leaf spots and the like, to see whether it is not possible to head off some of the more troublesome ones another year.

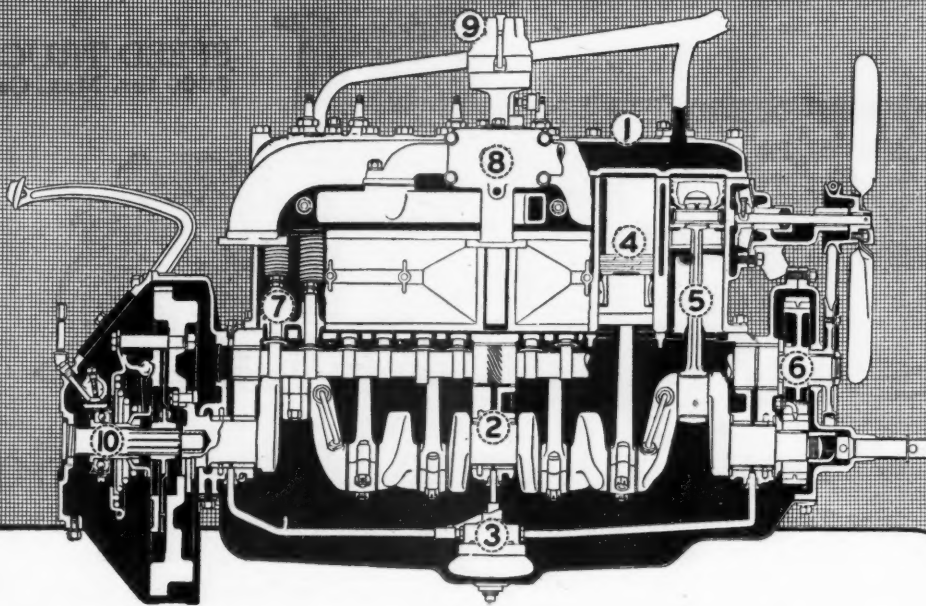
### The Nature of Strawberry Disease

Everybody on the farm knows a bug, an insect; but the plant disease is a different matter. Plant diseases cannot be seen until they have actually effected damage and loss. Then it is often too late to take steps to remedy the sick plant. It is now a well-recognized axiom that plant diseases must be prevented; it seems difficult to cure them. Strawberry diseases are no exception to this general rule. Many common diseases of strawberries are caused by fungi, that is, minute plant parasites which invade the various parts of the unfortunate plant to such a depth that sprays and dips will not, cannot, reach them; hence, the necessity of taking precautionary measures to prevent their occurrence.

### No Part of Strawberry Plant Exempt from Disease

Very few strawberry patches will fail to show some signs of disease on all parts of the plant. The roots as they grow in the moist soil have their own particular maladies; these diseases on roots usually take the form of a root rot, and no one seems to have done very much toward determining the cause and control of root-rots. These diseases usually show as a discoloration of the roots and an accompanying wilting or dying of the tops. Not infrequently, especially in the more southerly regions, the roots are attacked by nematodes and root knot. Swellings are produced and in severe cases, of course, the plant dies.

Leaves are affected by spots, scorch, mildew and yellowing (chlorosis). Perhaps a word about leaves would not be out of place here. Everyone knows that leaves are necessary organs of plants; they are green, a characteristic which makes it possible for them to manufacture carbohydrate foods. Plants do not get food from the soil. They get raw materials from the soil and oxygen from the air. They make food from these in the green leaves. Therefore, any leaf, or portion of leaf, that is killed cannot any longer make food. In severe cases, the common leaf spots do materially reduce the food-making powers of the foliage, but wherever leaf spots are conspicuously prevalent, attention should be given to their control. Similarly, mildews, which are white and which cause the leaves to roll and curl, should not be ignored, for they can, and sometimes do, cut the crop appreciably.



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④ Oakland cylinders are honed smooth as glass on special machines. Pistons and rings of the latest design are individually fitted into each cylinder with extreme care and precision. Vibration and wear are practically eliminated by this process.

⑤ The connecting rods are light and strong. The babbitt-lined bearings are permanently bonded to each

rod with pure tin—the most approved process and also the most expensive.

⑥ The camshaft is driven by a silent chain running in a bath of oil. This is conceded the best type of drive and the most accurate. There is a convenient external adjustment.

⑦ Oakland valves are of special, heat-resisting alloy steel. So efficient are they, that valve grinding is necessary only at very rare intervals.

⑧ The intake manifold is scientifically designed to insure perfect fuel distribution to all cylinders, and therefore smooth, economical operation. There is a handy temperature adjustment for summer and winter.

⑨ The electrical system maintains Remy standards of excellence. The spark control is entirely automatic, which means that the engine will deliver the maximum of power under all conditions.

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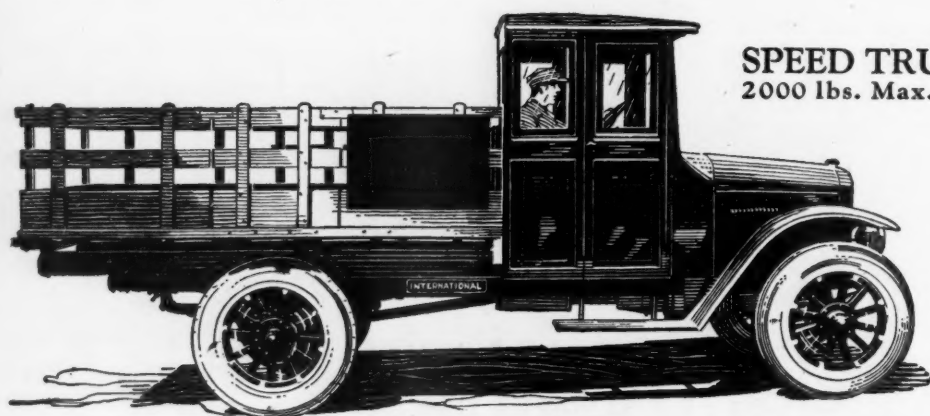
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# INTERNATIONAL HARVESTER TRUCKS COMPANY

ciably. And so it is with leaf scorch, yellowing and other leaf sicknesses. As a rule, farmers are most interested in the fruit; it brings the money. And, as a rule, here is where most attention should be given.

The rotten strawberry is the bane of existence of the grower, the packer and shipper, the transportation agency, the wholesaler, the jobber, the retailer, the consumer. There are several well-known rots of the berry: In the field, there is the gray mold rot; in transit, the Rhizopus rot, or "leak," as well as the watery soft rot. In addition, there are other decays but their characters are not as easily recognized; moreover they are apparently less destructive.

**Gray Mold Rot**—(1) It is primarily a field rot; it is of minor importance in transit, since the growth of the causal fungus is slow on ripe berries. (2) It is most abundant in cloudy, rainy weather. (3) It has no apparent preference for any variety. (4) It is worse in wet, low areas, or where berries are grown in the shade. (5) This disease is sometimes called "dry rot," in con-

trast to "leak," which is so characteristically a wet rot.

**"Leak," or Rhizopus Rot**—(1) A transportation difficulty rather than a field disease. (2) Leak is the most rapid rot known. (3) The name leak refers to the very characteristic way in which affected berries lose water to such an extent that it drips from the package. Much juice is lost, and the berries settle in the box as if they had suffered a real shrinkage. Mold, with black fruiting heads bearing spores, easily seen with the naked eye, usually develops on berries thus affected. (4) Usually this fungus causes a discoloration of the boxes and crates en route.

### Who Is Responsible for Rotten Berries?

It is clearly understood by all who have thought about the problem of decay of fruit and vegetables in transit that most of the spoilage starts in the field or packing house. No strawberry grower should be satisfied with a mere settlement of a claim against the transportation company for loss, no

matter how negligent that agency may have been. He should turn back to the methods of handling the crop, the actual growing, picking, sorting, washing, packing and loading. Two roads are open in producing and harvesting: One puts the strawberry into the car in good condition to carry; the other gives results which lead to the belief that some few growers have succeeded in making themselves expect that shipment will really improve the quality of a crate of berries! Strawberries, as with other fruits and vegetables, are not improved by refrigeration and shipment; this is certainly true of berries which are loaded in poor condition.

### What to Do

It has already been intimated that methods of management of the strawberry crop are closely related to marketing. Care in handling the berries is the key to the situation in many cases. An outline of what should be done in dealing with diseases of strawberries is set forth:

1. Freedom from bruise or wound.

Fruit must be picked and packed so that as little injury as possible results. The most important transit rot, for instance, does not penetrate the berry through the unbroken skin; it enters through bruises and other wounds. It should be borne in mind that strawberries are watery, soft, delicate and easily injured. They should, in fact, be handled just as little as possible.

**2. Washing Precautions.** Washing is often practiced before packing, especially where berries are sandy. This practice is said not to be necessarily harmful in itself, provided the fruit is packed wet. But, to allow the washed fruit to dry before packing has a decidedly injurious effect. Still better, if the fruit is to be washed, is the practice of packing dry and then washing; less bruising results from this procedure. Washing is a matter related somewhat to the time of picking.

**3. Time of Picking.** It is generally best to pick strawberries in the cooler part of the day, especially the evening, or late afternoon. Best keeping qualities may thus be expected. If picked during the heat of the day, the berries, which may already have the "leak" fungus on their surfaces, go into the car warm. It is desirable to pick at times of the day when the temperature is lowest, consistent with practicability.

**4. Temperature Factors.** Not only should the berries be picked when it is coolest, but the time intervening between the picking and loading should be shortened to the minimum. Rot in transit can be greatly reduced by lowering the temperature of the picked berries as quickly as possible. Berries which remain at a relatively high temperature are more certain to rot in transit than if they are cooled immediately on picking. It also makes a difference, too, what the temperature is in the car receiving the berries. Preferably the car should be cooled in advance of loading so that the berries will soon reach the temperature actually prevailing in the car. The "leak" fungus produces a crop of spores in 36 hours at a temperature of about 91 degrees Fahrenheit, but at about 52 degrees Fahrenheit, three weeks are required to produce these spores. This gives some indication of the value of a "pre-cooled" car. Where berries are washed, the process of running cold water over the fruit will usually cause a reduced temperature, especially if the fruit has been picked in the warmer portions of the day.

**5. Spraying for Leaf Diseases.** Although spraying is often advised for leaf spot diseases, it is not generally practiced. The reason probably is that growers do not feel that the operation would pay, and they feel uncertain that it is ever necessary. The spraying experts do not have the strawberry spraying program as well in hand as that of the apple and peach, nevertheless some work has been done to indicate the value of spraying to keep down leaf diseases, such as leaf spot. Recent federal experiments have also suggested strongly that spraying strawberries tends to reduce losses from rots in transit. This is particularly the case where berries are grown in areas of considerable rainfall. There is an inherent difficulty in the spraying of strawberries, namely that a plant may show berries in varying stages of development, from blossoms to ripe berries. But for leaf spot, wherever sufficiently troublesome, use Bordeaux mixture 4-4-50, making the first application before the blossoms open; after picking, if desirable to reduce leaf spot, spray once or twice as the occasion seems to demand. Such measures should be supplemented by removing dead or diseased leaves when setting new plants. Any sanitary measures designed to get rid of old diseased leaves also assists in the control of leaf spot, since the fungus causing the disease passes the winter either on the leaves or in them. Mowing and burning, to handle severe cases, are measures sometimes advised for leaf spot. In rare cases, it might be necessary to renew settings, beginning the patch all over; in such an instance, of course, the best subse-

(Concluded on page 19.)



## Growing Nursery Trees

(Continued from page 7)

The knife is then drawn upward so as to cut a slight distance into the wood and emerges about one-fourth inch above the bud. The finished bud carries with it a small portion of the wood and about one-half inch of the bark. This type of bud is generally called "the modified shield bud" and differs from the true shield bud in that no wood is taken with the latter. The true shield bud requires two cuts,



Buds inserted in mid or late summer remain dormant until the following spring. This photo shows a young shoot from such a bud. Note where original seedling was cut early in spring, forcing all growth into the bud.

one about three-fourths inch in length under the bud and into the wood, and the second, a cut above the bud through the bark. The bud with the attached bark is then ready for inserting. The advantage of this bud is that a closer contact is possible between the cambiums of the bud and stock. The bud is now inserted under the flaps of the "T," care being taken to get the bud facing up. The petiole stub can be used to push the bud in place. The bud should then be closely tied with string or raffia, wrapping about three times below the bud and a similar number of times above the bud. It is not necessary to wrap directly on the bud as is sometimes claimed.

About 10 days or two weeks after the buds have been made, the strings are cut in order to prevent girdling of the seedling. At this time it is possible to tell whether or not the buds have stuck. If not, the trees should be budded again, provided the



Progressive steps in budding. Left to right: Cutting "T" in stock; pushing bud into position; bud in final position; bud tied and operation completed.

bark still slips. Nothing need be done with the trees during the winter months.

### June Budded Trees Have a One-Year-Old Root

"June budding" is particularly adapted to peach trees. The budding operation is done early enough so as to get growth from the bud the same summer. This gives a seedling tree on a one-year-old root instead of a two-year root, as in the case of late summer budding. After the strings are cut, the top of the seedling is bent over and broken about four inches above the bud, care being taken not to sever this portion completely. Com-

plete removal at this time will probably cause the bud to be "drowned out." After the bud has made a growth of about four inches, the top of the original seedling should then be cut off about one-half inch above the bud, thus allowing all plant food to go into the new, rapidly-growing shoot. All growth from the stock should be kept off. At the end of the growing season, the "June budded" tree should be large enough for planting in the orchard.

### Buds on Trees Budded in Late Summer Remain Dormant Through Winter

Getting back again to the trees budded in late summer we find that the bud remains dormant throughout the winter months. Activity begins in the bud with the advent of favorable

soil moisture and climatic conditions, at which time the original seedling should be severed about one-half inch above the bud. This heavy cutting back causes the remaining stump to throw out excessive sucker growth, which, if allowed to remain, will grow at the expense of the bud. Therefore, all this growth should be rubbed off as soon as it makes its appearance. This will necessitate going through the nursery several times.

Utmost care should be given the growing shoot during the summer months. Irrigation water should be applied when necessary so as to keep the trees in a healthy, growing condition. At the end of the growing season, the trees are ready for planting to the orchard. As previously mentioned, these trees have a root system

one year older than the top. When digging from the nursery, a large part of the root system is lost, while in the case of "June budded" trees most of the root system remains intact.

**DIRECTORS** of the Michigan Fruit Growers, Inc., authorized the executive committee to employ an experienced sales manager.

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## Strawberry Culture

(Continued from page 3.)

cial varieties, in the order of their ripening, are as follows: Klondike, Aroma and Gandy; while in north Missouri the main varieties are: Dunlap, Warfield and some of the earlier sorts. The two principal commercial varieties of the state are Aroma and Dunlap, the Aroma succeeding best in the south and the Dunlap in the north. Warfield is well adapted to all parts of the state, and such sorts as Mitchel, Clyde, Bubach, Sample and Gandy are favorites for table use. The Progressive and Superb are the leading everbearing varieties.

When the strawberry is desired from spring until fall, the grower may plant an extra early variety, a mid-season sort and an everbearing variety. The very early varieties will supply a moderate crop, the mid-season sorts the main crop, and the everbearing varieties fresh fruit for table use during late summer and early fall. For best results, the grower should limit his planting to a few varieties.

Some varieties, like Sample, may produce little or no fruit when planted alone, and are called pistillate or imperfect varieties because of the plant's failure to produce the pollen necessary for fertilization. This difficulty may be overcome by planting every fourth or fifth row to a staminate or perfect variety like Dunlap. The staminate or perfect varieties produce sufficient pollen for self fertilization and usually enough to fertilize the blossoms of pistillate or imperfect sorts which grow near them.

A partial list of standard varieties is given below, with the date of ripening indicated. Some of these varieties should do well in all parts of the state. The letter (S) indicates a staminate or perfect variety and (P) a pistillate or imperfect sort.

Early	Medium Late
Early Ozark (S)	Sample (P)
Mitchell (S)	Klondike (S)
Excelsior (S)	Aroma (S)
Medium Early	Late
Crescent (P)	Gandy (S)
Clyde (S)	
Warfield (P)	
Mid-season	Everbearing
Haverland (P)	Progressive (P)
Dunlap (S)	Superb (P)
Bubach (S)	

## Preparation of Soil

For planting in the spring, it is generally best to plow the ground during the fall or winter where conditions will permit. By so doing, the grower is usually able to prepare the field for planting earlier in the spring. A firmer and more compact soil results from fall or winter plowing. This is an advantage to the strawberry plant because such soil preparation usually makes available a more constant water supply to the roots of strawberry plants.

If the ground is plowed in the fall or winter, it is generally best to postpone harrowing or disking until early in the spring. With some soils, several diskings or harrowings may be necessary to put the soil in the proper condition for planting. It is important that the surface soil be stirred sufficiently to make the ground loose and friable.

## Planting

Early spring planting is generally preferable to late summer or fall planting. Spring set plants, except everbearing varieties, do not bear fruit until the following year. Plants set in the fall and grown under favorable conditions will bear a fair crop the following spring. For spring setting, the planting should be done as soon as the soil will do to work, while the latter part of August or early September is usually best for fall planting.

The best results are generally secured by purchasing the plants from some reliable nurseryman who makes a specialty of the business. Many growers are in the habit of procuring plants for setting from the old strawberry beds or fields, and if good judgment and care are used, satisfactory returns should be obtained. The best growers agree that it is highly impor-

tant to plant sturdy, strong, vigorous, one-year-old plants. There is not generally enough thought and attention given to the matter of securing the best plants.

Many different planting systems are followed. The commercial growers generally use the matted row system and for Missouri conditions, it appears to be the most satisfactory and profitable system. It is the simplest and easiest to establish and maintain. The runners are allowed to set at random in a row 18 to 24 inches wide. Some growers train the runners and space the plants while hoeing, but this is not required. The plow breaks off the runners and drags them lengthwise, preventing the middles between the rows from filling with plants. If the runners are weighted lightly with soil they will root quicker, although this practice is not usually required. Under certain conditions as regards the market, the amount of land to be devoted to the crop and labor required, it may be more desirable to plant the crop to some other system. In the matted row system, the plants are set in rows from three to three and one-half feet apart, while the plants in the row are set two and one-half to three feet apart.

For the home garden, the rows may be placed closer together and the plants in the row may be placed closer. Plantings in rows two to two and one-half feet apart, with the plants one to one and one-half feet apart in the rows, are common.

## How to Set Strawberries

In digging the plants, the root system is disturbed and usually it is reduced considerably. To re-establish the balance between the roots and top and to reduce the evaporating surface, all the leaves except the two in the center should be pinched off before transplanting. It is also advisable usually to shorten the roots back a little.

It is important that strawberry plants be transplanted to the proper depth. An opening in the prepared soil should be made just deep and wide enough to accommodate the roots when spread slightly and to allow the crown of the plant to be level with the ground when the soil has been thoroughly firmed about the roots. If the crown of the plant is covered with the soil, it will usually die or make a slow growth, and if the crown extends too far above the surface of the ground, it may dry out and the plant will die or will be unprofitable as a result.

## Cultivation

Perhaps there is no more important factor in strawberry production than thorough and frequent stirring of the soil to make available plant food and to assist in the conservation of moisture. For best results, as many as 12 or 15 plowings and hoeings may be required, although few strawberry fields receive this much care. In other words, the plants should be cultivated at intervals of 10 days or two weeks from the time they are set until vegetation is killed by the frost in the fall. The number of plowings and hoeings will depend a great deal upon the amount of rainfall. It is very important that the ground be stirred as soon as it will do to work after each rain, and if the interval between rains is four or five weeks, shallow cultivation should generally be practiced. All blossom stems should be pinched off during the first year.

## Mulching

Under most conditions, mulching is a profitable practice in Missouri, although many of the Ozark strawberry producers procure profitable yields from their fields without mulching. This is particularly true where the surface of the soil is covered with stones, chert or flint rock, and there is only a small amount of soil near the surface. The stones appear to have an effect upon the soil similar to that of a straw mulch.

The mulch should generally be spread in the fall or early winter after the first hard freeze. A mulch from two to four inches in depth will conserve moisture, tend to prevent heaving of the soil and keep the ripe fruit



clean at harvest time. The best material for this purpose is wheat straw. Rye straw, hay and leaves are frequently used, but these pack closer than the wheat straw and are generally not as satisfactory. The mulch should be raked lightly from the center of the rows toward the middles between the rows early in the spring just before growth starts. If the mulch is left on the rows too late, the time of ripening may be delayed for a week or more.

#### Harvesting and Marketing

The harvesting period for the Ozark region generally commences about May twentieth and lasts three or four weeks. In central and north Missouri, the harvest is from a week to 10 days later and the period is slightly shorter than that of the Ozark region.

In some communities, local help is relied upon for the picking, but in a great many districts it is necessary to import pickers. When the pickers are brought in, camping grounds, water, tents and other facilities are often furnished.

To make marketing a success, standard varieties must be grown, adequate shipping facilities must be maintained, and an efficient marketing organization is essential. The acreage near the shipping point should be sufficient to load at least one car daily. This will require from 75 to 100 acres, which should be located within a radius of not more than three or four miles from the shipping point.

#### Renewing the Strawberry Field

To renew the strawberry field, the plants should be mowed and raked off with the mulch as soon as possible after the harvesting is over. The mowing and raking will assist in destroying injurious diseases and insects. The work of plowing and hoeing will also be much more easily accomplished after mowing and raking.

Strawberry fields are renewed after the first crop, and in some cases, after the second and third crops. It is usually not profitable, however, to renew the crop more than once.

The work of renewal consists of plowing on both sides of the strawberry row, throwing the soil toward the center. This covers the weak plants near the ends of the runners and leaves the strongest ones, or the ones nearest the old parent plants. The soil is leveled by harrowing and disking. The new row of plants, therefore, is made in the center of the old row. After plowing and harrowing, the hoe is used to thin the new plants and to cut out the old ones. After removal, frequent and thorough cultivations should be given until growth ceases in the fall. The yield from a renewed field is generally not as good as that from a field fruiting the first time because the plants are usually not as vigorous and thrifty as those from the new fields.

#### Insects and Diseases

In many parts of the state strawberries may be grown successfully without a great deal of trouble from the attacks of insect pests and plant diseases. This will be particularly true where the strawberry field is rotated with other crops and where strong, healthy plants are used for the setting of the field.

#### Inside Story of the Apple

(Continued from page 5.)

we have of the actual condition of maturity of the fruit.

#### Chemical Changes in the Fruit

This article should not be closed without a brief discussion of the actual changes going on inside the fruit as it develops upon the tree and approaches maturity.

From very early in the growing season, until the fruit is ready to pick, there is a continuous increase in the amount of sugar present in the fruit. In the very young fruit the sugar content is relatively low, while starch is very abundant. As the fruit grows and matures the sugar content becomes higher and higher, while the starch present gradually decreases.

By the time the fruit is ready to pick there is a relatively small quantity of starch present.

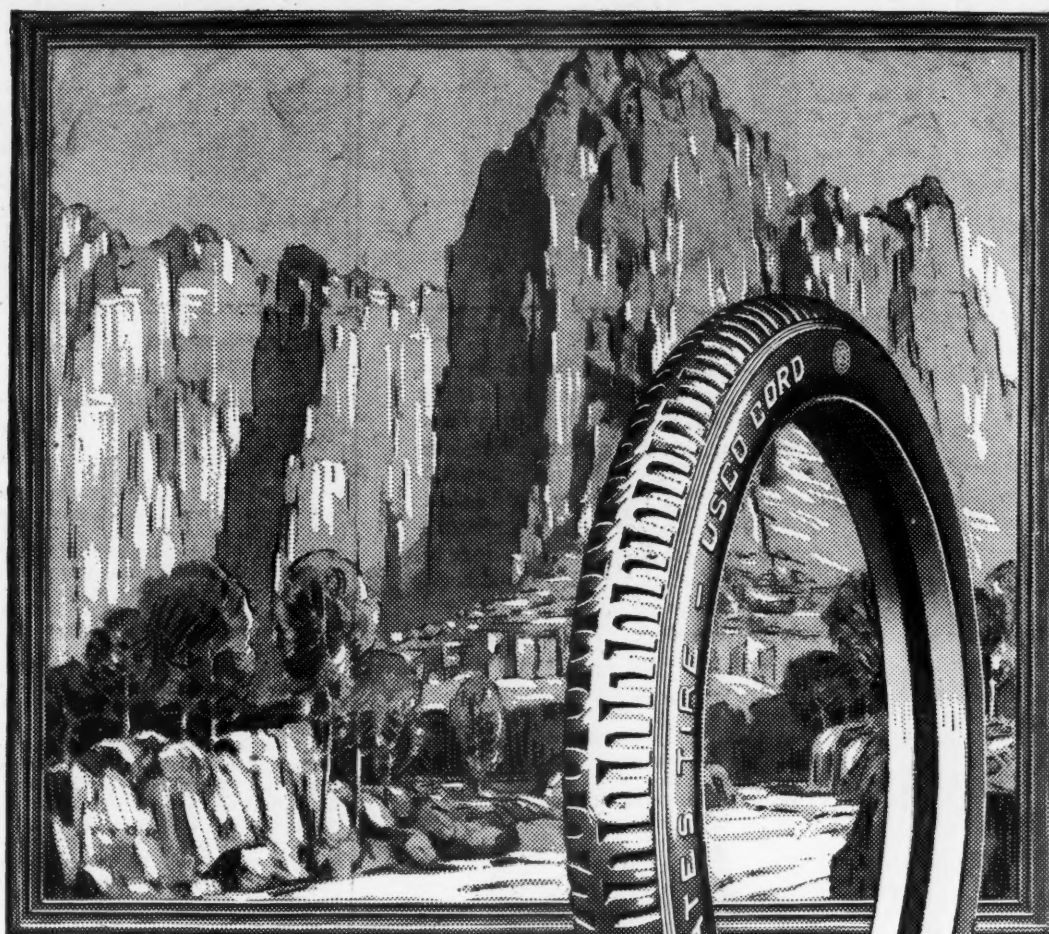
The acidity change in the fruit is also very marked. In the young fruit the acid content is very high, but as the fruit approaches maturity there is a gradual but steady decrease in the amount of acid present. There are also other chemical changes going on within the fruit which are only imperfectly understood. The changes in the jelly forming constituents, or the pectins, which probably are intimately associated with the softening of the apple which occurs as it approaches maturity on the tree, are of great importance, but little understood.

Thus it is seen that many factors

are concerned in the development of the apple fruit and in its ripening on the tree. Some of these factors the grower can greatly influence by his methods of orchard management. Some he can control in part, while many of them are almost beyond his influence. Only, however, by an intelligent understanding of the factors involved can he really handle his orchard to get the best results year after year in crop production.

The next, and concluding, article of this series will deal with the time of picking of the fruit and the exact influence of various factors in the storage life of the fruit.

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#### High Comedy

Nervous Passenger (in aerial taxi, about 5000 feet up): "W-w-what are you l-l-laughing at, driver?"

Driver: "I'm just laughing at the superintendent. About this time he'll be searching for me all over the lunatic asylum."—*Life.*



A mature apple which has been pitted and deformed by red bugs.



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## Fighting Insects From the Air

AN INTERESTING development of the future, for commercial orchard communities, is the possibility of fighting insect pests from the air on a large scale. Wherever trees have been protected by spraying or dusting from the ground, the same mixtures can be applied from the air. Experiments conducted by the Army Air Service in co-operation with the United States Department of Agriculture proved the feasibility and practical usefulness of the method, and further studies are being carried on each summer with the aim of still further improving the apparatus and perfecting the technique. The advantages are obvious, for an airplane flying at 60 miles an hour and passing to and fro on lanes spaced 100 feet apart can cover 100 acres in half an hour if enough of the dusting powder to last for that length of time in continuous application can be carried.

Although the first experiments on tree dusting from the air were made with airplanes, the airship has since come into use for the purpose. Lighter-than-air craft, such as small dirigibles of the Zeppelin type, the patents for which have been recently taken over by American manufacturers, have many advantages for this work. They carry a crew of several men, who are free to move about while in flight, and so can readily make adjustments of the apparatus or reload it. They may be designed to have a large reserve of lift, permitting the carriage of a supply of powder for covering a great deal of territory in a single flight. They can be throttled down to any speed desired, so that the application can be made more or less intensive by varying the rate at which the airship passes over the trees. Finally, but most important of all, the airship is immune from the danger of the forced landing. In order that the material used for dusting may be accurately distributed where it is most needed, the

machine doing the work must fly very low, and if an airplane is used and the engine fails when flying over an orchard or a forest it is of course unlikely that a good landing field will be at hand. Although forced landings are rare when engines are properly cared for, and they have been almost unknown in the forest fire patrol, the possibility of their occurrence does represent a hazard to the machine which is non-existent in the case of the airship. In any case, whether the ultimate decision favors the airplane, the airship, or a choice depending on local conditions in each individual case, the use of aircraft in the orchard for dusting may become a practical reality.

At the present time it seems probable that it will only be used on large acreages or in localities where the smaller growers co-operate and have their spraying and dusting done at the same time. Liquid sprays could also be applied by the same method, although there are some disadvantages due to the excess carrying weight of the liquid over the dust.

## Tupelo Fruit Instead of Olives

by Robert Sparks Walker

DO YOU know that the early French settlers and explorers to the United States gathered the fruit from the tupelo, or blackgum tree and preserved it like people preserve olives? You have probably eaten a very tasty delicacy made by honey-bees and called tupelo honey. If so, then you have eaten the condensed nectar from the sourgum or blackgum flowers.

But there are thousands of bushels of the small blackgum berries that go to waste each season, because people have not yet begun to preserve them. The early French explorers who gathered and used them as substitutes for olives declared them to be "fine eating."

## Orchard Problems and Their Solution



Edited by Paul C. Stark

### Treatment of Pruning Wounds

Is it necessary to apply any wound dressings to cuts made in pruning? I have seen it advised that all pruning cuts of two or three inches diameter should be painted with some substance to prevent decay.—A. F. K., West Virginia.

IN THE past, the painting of pruning cuts was advised much more than it is at the present time. Recent experiments do not seem to justify many of the recommendations which have been made for treating wounds, and, in fact, many of them have actually been found injurious rather than beneficial.

Wound coverings, while they may often keep out diseases, cause certain injury to the exposed surface and retard healing. This is particularly true if the wood is very green and there is some running of sap. It is much more important to have the cut properly made, so that there are no rough surfaces, and left in such a way that all water will drain off from the wound. Moreover, most wound dressings either form an imperfect cover or are effective such a short time that they do not do much good.

It has been found that ordinary spraying of the fungicidal sprays, such as Lime-Sulphur and Bordeaux Mixture, serves the purpose as a wound covering with less trouble and expense than when an actual wound paint is applied. On very large ones, however, it may be practical to apply some dressing, such as white lead paint or Bordeaux paste. Another good dressing which has recently been recommended is sodium silicate, commonly known as "water-glass." This substance is not only inexpensive but is very effective due to the mechanical protection caused by sealing over the surface of the cut.

### Advantages of Grafted Tree

From the standpoint of the orchardists, are there any advantages in favor of grafted trees over budded trees? I am particularly interested in knowing the difference between grafted and budded trees of the apple.—J. B. S., Wisconsin.

THERE are several advantages of the grafted tree over the budded tree, particularly for northern climates. In the first place, the grafted tree is decidedly hardier, provided the scion is of a hardy variety. This is due to the fact that the scion portion of the tree when grafted is planted several inches below the surface of the ground while in the budded tree the seedling portion, which may not be hardy, comes to the surface of the ground and sometimes a few inches above.

Another point in favor of the grafted tree is that such trees are apt to vary much less than budded trees because such trees are often scion-rooted, thus eliminating this variability.

Authorities in northern sections are giving considerable attention to these advantages of grafted trees for the north.

### Formula for Whitewash

Will you give me a good formula for making whitewash? I want to paint the trunks of some of my young apple trees to prevent sunscald.—E. G. D., Kentucky.

THE BEST method of preventing sunscald is by leaving on the lower branches of the tree so that the trunk is naturally shaded. However, it may be beneficial in some cases to whitewash the trunks for the first year or two until these branches develop enough to furnish such shade.

A very good whitewash can be made for use on the fruit trees by the following formula: Quicklime, 30 pounds; tallow, four pounds; salt, five pounds; water enough to make a thin paste. This mixture should be applied to the tree with a brush as soon after planting as possible and should be renewed whenever necessary until the second winter or until the shade of the trees becomes adequate to protect their own trunks.

### Late Application of Nitrogen

I have just planted a young apple orchard this spring and I am wondering how late in the summer I can put nitrate of soda on these trees without injury. I want to have these trees grow as much as possible this summer and still not have it result in any injury through the growth not hardening properly in the fall.—A. M. B., Missouri.

IT WILL prove all right to place a small amount of nitrogen fertilizer on your young trees as late as the middle of June. Either nitrate of soda or sulphate of ammonia is quickly available and therefore the trees will get benefit from the fertilizer immediately. Sometime after this, however, usually in mid-summer, the growth of the tree may be checked by stopping cultivation and planting a cover crop such as rye, oats, or a combination of rye and vetch. One thing to consider is to not apply too much nitrogen fertilizer while the trees are very young. Usually one-third of a pound is sufficient for a one-year tree.

### Dehorning Peach Trees

Is it too late to dehorn peach trees several weeks after the growth starts? I have no crop this year and would like to give the trees a very severe pruning.—R. S., New York.

ALTHOUGH this is not the best time to prune, peach trees will survive a severe pruning when other fruits will not. I see no reason why you could not dehorn your trees even though it is now rather late for ordinary pruning. The first thing of importance is to cut the long limbs back to well placed laterals so that the resulting tree will be not only lower but will be more vigorous. Cutting back brings the fruit bearing surface of the tree near the ground and as long as you have no crop this year nothing will be lost. Peach trees produce fruit on shoots of one-year wood so that the greater amount of one-year wood which can be produced, the better are the chances for a large bloom the following year.

### Orange Rust of Raspberries

There is some disease on my raspberry plants which is affecting the young leaves and causing irregular shaped orange patches and making the leaves curl. What is this disease and what can we do to prevent it?—R. A. M., Tennessee.

THE DISEASE which you described is undoubtedly the Orange Rust. This disease affects the leaves and young shoots of both raspberries and blackberries and sometimes causes considerable damage, not only by curling the leaves but by stunting the canes of these fruits. Orange Rust cannot be controlled by spraying since the fungus grows on the roots of the plants as well as on the canes. The best method of controlling this disease is removing the diseased plants and burning, so that the rust cannot spread to the healthy plants.



## Orchard Tillage

by U. P. Hedrick

New York Agricultural Experiment Station

**TO TILL** is to plow, hoe or cultivate the soil. No crop grown by man expresses its possibilities without some sort of tillage. Tillage is the chief item in agriculture and it has come to symbolize the art. The farmer is spoken of as a tiller of the soil.

Everyone who grows crops accepts this generalization as to the value of tillage in general agriculture. Yet somehow the notion exists that fruit trees are unlike other crops and do not need tillage. It is a notion that has been discredited many times by careful experimental work, and every observant man may note in any fruit region in America that the health and energy of any kind of fruit plant is better maintained in tilled than in untilled land.

Commercial fruit growers everywhere recognize that clean tillage in the first part of the season, followed by a cover crop in the latter part, is the most dependable procedure in growing any kind of a fruiting plant. As the manufacturers say, "It is the standardized process." It is the first operation the orchardist turns to in

To secure as well as possible access of air so that the soil may be thoroughly ventilated and better warmed.

To make the land more uniform in depth and texture so that the plants will be uniform in vigor throughout the plantation.

To add to the amount of humus in the soil by better admixture of the vegetable matter so that the plant-food materials will be more easily soluble and the growth of beneficial bacteria will be encouraged.

To kill weeds and thereby reduce the waste of plant-foods which they take from the soil.

To destroy insects, fungi and vermin, and to bring about conditions in which these terrible pests of fruit growing will not thrive.

To make possible the production of cover crops, to be turned under to furnish humus or retained to prevent surface washing or soil drifting.

Are not these objects worth striving for in any orchard? Can they be as well attained by any other means than tillage? The experience of the most



Sod mulch and tillage side by side in a Baldwin apple orchard. The tilled trees during a period of 10 years yielded nearly twice as much fruit as those kept in sod.

renovating an old orchard. Trees may grow well in sod, but there are few orchards indeed in which the same trees may not be expected to do better under tillage.

All of this is commonplace to experienced fruit growers. They do not need to be told to till, and are tired of hearing the matter discussed. Yet acre for acre, there are probably more orchards in sod than under tillage in America. This does not demonstrate the desirability of sod, but, since letting trees run to grass is cheap and easy and tilling them is laborious and expensive, it chiefly shows that many fruit growers are careless, or lazy, or slovenly or practice not spending where they should practice right spending.

Why till an orchard? What objects are gained? The reasons for tilling are set forth in hundreds of books and bulletins, yet it is well that every man who works the land should be reminded from time to time of the beneficial effects of stirring the soil.

Orchards should be tilled:

To regulate the amount of soil moisture, so that there should be neither an excess nor a deficiency of water to carry food to all parts of the plant.

To maintain a loose and friable soil structure, so that the roots of the tilled plants may spread readily and widely and so come in contact with the greatest possible quantity of food materials.

To make the root-habitation commodious, sanitary and adapted both to the needs of the plants in it and to the bacteria which minister to them.

successful fruit growers the country over seems to be that they are most easily, cheaply and efficiently obtained by tillage.

The question now arises as to what good tillage is. The practice of tilling must vary in different fruit regions, in different seasons, soils and for different crops. Only general rules can be given. The measure of what good tillage is ought not to be the number of times the operation is performed, but rather how well the objects of tillage are attained, yet of this only he who does the tilling can be the judge and so advice must be given in terms of how often to till.

In the average orchard in the United States, tillage begins with turning over the soil with the plow in late fall or early spring. This plowing is followed by thorough cultivation from two to six times in spring and summer with cultivator, harrow, spring-tooth or disk. Toward the end of summer, when growth is slowing up or has stopped, tillage should cease and the cover crop most suited to the needs of the orchard should be planted. Some prefer to let a growth of weeds form the cover crop, to which there can be small objection if the weeds are plentiful enough and not too objectionable in character.

Clean tillage should be almost a universal practice in the orchards of America, but there are occasional exceptions. On hilly lands that wash badly, some method of mulching must usually be practiced. Perhaps the best method is to sow a thrifty grass, the

(Concluded on page 24)



"Yes, sir, that's the Burton place. Wonderful what a difference new roofs make!"

## What impression does your farm make?

You take a lot of pride in your farm. You like to have passers-by say: "That's a prosperous looking place." There's satisfaction, too, in knowing your property will fetch a good price in case you ever want to sell. This in itself is reason enough for keeping up your place. And nothing adds so much to the appearance and value of a farm as freshly painted buildings, protected by attractive, colorful, weather-tight roofs.

For your home a roof of Barrett Shingles. Their soft colors give you a roof that blends with the landscape and harmonizes with the architecture of your house. For barn, garage, implement shed—Barrett Roll Roofing (Plain-Surfaced and Mineral-Surfaced). Barrett Roofs will add to the value and salability of your farm.

**Lasting Protection:** Weather-tight, fire-resisting, no patching, no painting—a Barrett Roof is practically indestructible—off your mind for good and all.

**Sound Economy:** The first cost is low, and Barrett Roofings—Shingles or Roll—are easy and economical to lay. No skilled labor is needed.

Call on the nearest roofing dealer. Ask him to show you Barrett Roofings. (Leading dealers have them.) He will gladly cooperate with you in working out your roofing problem.

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Send us your address and we will mail you, absolutely free, a series of booklets that give valuable facts about our different types of roofing. These books also describe other products of great money-saving value. Drop us a postal card or brief letter—today!

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#### Everlastic Smooth-Surfaced Roofing

The most popular of plain-surfaced roll roofings. Made of best grade roofing-felt, thoroughly saturated with high-grade waterproofing material. Under surface is protected by rot-proof seal-back. Tough, pliable, elastic, durable, and low in price. Easy to lay. Nails and cement in each roll.

#### Everlastic Mineral-Surfaced Roofing

A beautiful and enduring roll roofing. Mineral-surfaced in red, green, or blue-black. Has rot-proof seal-back. Nails and cement in each roll. Very popular for bungalows, cottages, garages, and all farm buildings.

#### Everlastic Giant Shingles

These "Giants" for wear and service are handsome enough for the expensive home, economical enough for small farm house or cottage. Their weather side is mineral-surfaced in beautiful shades of red, green, or blue-black. This fadeless mineral surface resists fire and never needs painting. Their base is extra heavy roofing-felt thoroughly waterproof. Because of this extra-thick, extra-rigid base, these shingles can be laid right over the old roof—a big saving on reroofing jobs. Size 8x12 $\frac{1}{2}$  inches. Are laid easily and without waste.

#### Everlastic Single Shingles

Mineral-surfaced in red, green, or blue-black. Base of

best grade roofing-felt. These shingles are staunchly weather-proof, fire-resisting and need no painting. Size 8x12 $\frac{1}{2}$  inches.

#### Everlastic Multi-Shingles

Four shingles to a strip. Mineral-surfaced in red, green, or blue-black. Two sizes—10 inches and 12 $\frac{1}{2}$  inches deep, both 32 inches long. The 12 $\frac{1}{2}$ -inch Multi-Shingle, laid 4 inches to the weather, gives three-ply roof—the 10-inch gives two-ply roof.

#### Everlastic Octagonal Strip Shingles

The latest in strip shingles. Mineral-surfaced in red, green, or blue-black. Afford novel designs by interchanging red strips with green, or red strips with blue-black.

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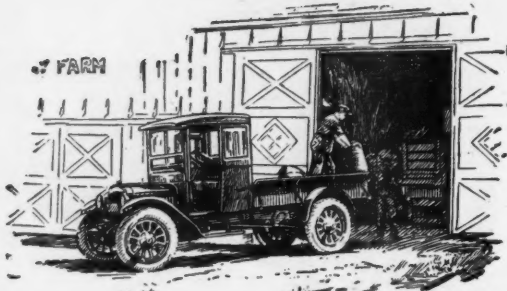
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# Barrett

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## Economical Hauling For Every Fruit Farm Need

GMC trucks are helping to solve many of the problems of the fruit grower. In harvest time when fruit is moved directly from orchard to the shipper, GMC has not only power to move a full capacity load any place where wheels can get traction, but it also provides a speed on good roads that assures the least possible time spent on the road and the maximum number of trips every day.

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Protect your fruit and rid your orchard and garden of Aphis and similar destructive insects at a cost of only a few cents a tree. "Black Leaf 40," the "Old Reliable" nicotine spray, is recommended by Agricultural Colleges and Experiment Stations. Spray singly or in combination with solutions for scale, codling moth and other orchard pests.

Ask your Dealer for "Black Leaf 40" and new leaflets. If he is out, write

Tobacco By-Products & Chemical Corp.  
Incorporated  
Louisville, Ky.

**Kills  
Aphis**

# "Black Leaf 40"

40% Nicotine



Edited by C. E. Bassett

IN OUTLINING the purposes and methods of the Northwest Fruit Growers' Commission, President F. H. Moses, of Cashmere, Wash., says: "How can we get more money in the fruit growers' pockets?"

"Three big tasks must be performed to accomplish this:

"1—Better markets must be developed both at home and abroad.

"2—Costs of transportation and distribution must be reduced both at home and abroad.

"3—The cost of materials and of other essentials for which the grower pays must be lowered.

"The retailer must be reached if we are to increase the demand for boxed apples.

"High prices charged by retailers are the greatest barrier to a heavier demand for boxed apples. When apples are cheap to the retailer they should be cheap to the consumer. At present we are doing nothing to show the retailer the wisdom of making heavy sales of a satisfactory article at a moderate profit. We are allowing him to hold our apples at high prices until they are over-ripe and out of condition.

"The retailer must be reached in order that he may know how to make up as beautiful a window display of apples as he does of oranges. He must be reached by the growers' representative if he is to learn to sell our apples by the box while they are in good condition. Sunkist growers are reaching 2500 dealers annually through their 'sales scouts' who use Ford cars to carry display material direct to their door. These orange growers reach 15,000 dealers every year by mail.

"This commission is of the opinion that the only way our marketing can be put on a sound basis is to start with a grower organization and build from the ground up, building carefully and well, until such a time as the growers of the Northwest will, as nearly as possible, all be cemented together, using their own shipping, storing and selling equipment, and with their own representatives in the markets of the world.

"The structure of the organization consists of:

"1—Local associations of growers, for packing, pooling and warehousing fruit, and for distributing supplies to growers; and

"2—Sub-exchanges, to sell the fruits of groups of local associations, and

"3—A central exchange to maintain a sales organization in the markets of the world, assemble and disseminate sales information, serve as an advisory sales agency, co-operating with the sub-exchanges in making sales, supervise sales in foreign markets, administer advertising and carry on market exploitation, purchase supplies, and perform all of the many industrial services that should receive the united force and attention of the growers of the Northwest.

"In this structure it is intended that the established grower organizations should take their places as sub-exchanges, keeping their sales offices and supervising the sales of their fruit as carefully as it has ever been sold in the past, and retaining the old customers with whom their brands are a favorite.

"The central exchange would be the agency of the organized growers of the Northwest through which their combined strength may be exerted in establishing better distribution, in building greater markets and in performing all of the functions required

to protect the best interests of the producers. Its work would be carried out through necessary departments, among which would be: Domestic sales, export, advertising and public relations, auditing, field and traffic. The traffic department would be supported by a percentage of loss and damage claims collected, said percentage to compare with commissions charged by commercial traffic bureaus.

"To start our permanent sales organization, the use of established brokers is recommended, because of their well developed sales talent and established connections. These representatives properly supervised by regional salaried division agents, would provide Northwestern growers with a highly efficient sales machine from the outset. It is recommended that dealers' service representatives be employed as trade energizers to educate jobbers and retailers, and that their work be directed from the eastern division offices."

AGRICULTURAL problems are vastly more complex than they were even a generation ago. Once almost self-sufficient and independent, today the farmer finds himself far removed and separated by a long line of intermediate agencies from his consumer-customer, leaving him often in a position of disadvantage as an individual producer, even when he applies modern business methods and sound business sagacity in his operations. It is, therefore, not strange that he should seek to apply to agriculture those principles of production and distribution found successful in other industries. His rightful ambition is to make, where feasible, a general application of successful business experience to agricultural problems.

The co-operative marketing idea has taken strong hold on the public mind and there is a widespread feeling that appreciable benefits will accrue to both producer and consumer from co-operative marketing properly applied. This movement has made much progress the past few years and has been successful in the distribution of fruits, cotton, tobacco and other products.

These successes have attracted nationwide attention and many bankers are using every means at their command to inform themselves fully on marketing problems so that they may co-operate intelligently.

It would be unfortunate if the farmer became imbued with the idea that co-operative marketing in itself is a panacea for all agricultural ills. Whatever the merits of co-operative marketing, it has limitations. Co-operative marketing cannot prevent other countries with cheaper land and labor from selling at a price unattractive to us. It cannot successfully override the law of supply and demand, or maintain, for any length of time, an artificially high price by withholding from market a product for which there is demand. By fiat or iron-clad rule it cannot unduly limit production.

A well organized, wisely managed co-operative association can accomplish much: It may prevent untimely dumping of products; it may secure better credit facilities; it may extend existing markets; it may even create new markets. But, obviously, its operations will be as amenable to good management and economic law as are those of other business enterprises.

AT THE annual meeting of the Federated Fruit and Vegetable Growers, Inc., held at the Sherman Hotel in Chicago, the following officers and

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directors were elected: H. W. Jeffers, president, Plainsboro, N. J.; J. L. Benton, vice-president; C. P. Earley, vice-president; W. W. Pickard, treasurer, and C. B. Lewis, secretary.

Directors elected are: H. W. Jeffers, J. L. Benton, C. P. Earley, C. B. Lewis, J. J. Parrish, C. L. Neill, A. O. Eckert, H. G. Crissey, M. C. Burritt, George S. Dunham, O. F. E. Winberg, S. D. Dipert, R. B. Chapman, F. W. Pulliam, H. O. Hamm and J. A. Warman. The following directors at large: O. E. Bradfute, Henry Morgenthau, Jr., and E. P. Porcher.

The executive committee elected by the board consists of M. C. Burritt, H. W. Jeffers, A. O. Eckert, C. B. Lewis and C. P. Earley.

Reports were submitted to the meeting by General Manager Arthur Rule and Sales Manager Deegan. Several large contracts have been secured to take the place of important blocks of tonnage that have been lost.

**CONSUL DONALD**, of Johannesburg, South Africa, in a report to the Department of Commerce, announces the completion of an organization supported by 31 co-operative companies, with a membership of over 1000 individual growers. This co-operative movement follows the American plan for such organizations, and now controls 86 per cent of the citrus and 95 per cent of the deciduous fruit exports. Consul Donald says that the organization is firmly established and is in a position to present a united front in matters of shipping, harbor and railway control, as well as advertising.

**GROWER** members of the California Cherry Growers' Ass'n, San Francisco, Calif., received \$385,210 as their share of the gross sales of the 1923 crop, which was sold for \$405,438. Expenses in connection with the marketing of the crop were approximately \$30,000.

The association was formed in 1921. That year its total business amounted to \$79,021, and the following year to \$292,574. The present membership of the association, which is non-stock, is 600. Its only business is that of marketing cherries. A marketing agency relationship is set up by the marketing contract which includes the crop years of 1924 and 1925.

**A** MARKETING agreement has been put into effect by the National Pecan Growers' Exchange, Albany, Ga., a non-profit, non-capital stock organization, chartered under the co-operative marketing act of the State of Georgia enacted in 1921. This contract provides that all pecan nuts owned or controlled by the signers of the agreement shall be sold through the exchange for the years 1924, 1925, 1926, 1927 and 1928, the exchange functioning in the capacity of sales agent. All nuts are to be graded and those of like grade, type and quality intermingled for marketing purposes. Advances are to be made upon the nuts delivered as the financial conditions of the exchange will permit. Liquidated damages in case of non-delivery are fixed at from two cents to seven cents a pound, according to variety and grade of nuts.

**THE HONORARY** degree of Doctor of Laws was recently conferred by the University of California upon C. C. Teague, president of the California Fruit Growers' Exchange, in recognition of his services for the improvement of conditions connected with growing, financing and marketing California crops. Mr. Teague is considered a leading figure in the agricultural activities of California, and has given much attention to the perfecting of the co-operative method of marketing farm produce.

**THE CALIFORNIA** Fruit Growers' Exchange is the largest growers' co-operative handling fruit or vegetables. Its annual business amounted to \$56,902,000 in 1921. The Sun-Maid Raisin Growers are a close second, having handled \$40,000,000 worth of raisins the year before. Other impor-

tant fruit growers' co-operatives are the California Prune Growers, \$18,000,000; the California Fruit Exchange, \$14,000,000; the Florida Citrus Exchange, \$13,000,000; the California Walnut Growers, \$11,000,000; Mutual Orange Distributors, \$10,000,000; the Wenatchee Apple Growers, \$4,000,000. Even a comparatively small crop like cranberries, when organized, assumes rather large proportions. For example, the American Cranberry Exchange's annual business according to its latest figures amounts to \$3,858,196.

**AT** A MASS meeting at Danville, Va., on March 14, over \$67,000 was subscribed in 30 minutes toward the capital stock of the Virginia Agricultural Credit Corp. It is proposed to set up an organization which will have sufficient capital to furnish, with the aid of the Intermediate Credit Bank, production credit for a large part of the state. The par value of the stock of the corporation is \$100 per share.

**A** SPECIAL campaign committee has been appointed by the Western New York Fruit Growers' Co-operative Packing Ass'n, Inc., Rochester, N. Y., to conduct an expansion campaign. It is proposed to increase the volume of business of the association, to provide facilities for handling fruit in about 10 communities, and to ask the members to sign a five-year contract to deliver all their fruits to the association.

**THE BAYFIELD** Peninsula Fruit Ass'n, of Bayfield, Wis., has entered its fifteenth year of successful co-operative marketing of strawberries, red raspberries and apples. These fruits are marketed in carload lots, as well as small express shipments, express shipments also being made of other small fruits and cherries. Hay and feed, implements, spray materials, fertilizers and other supplies are handled by the association for the growers. Last year the gross sales of the association were \$122,000.

The Bayfield Peninsula Fruit Ass'n has 200 members, the board of directors consisting of nine grower members. The manager is hired the year round. At present it is considering, with other associations in the Bayfield district, joining a national sales agency and erecting a pre-cooling plant.

**SIX HUNDRED** sixty-seven farmers' business organizations reported to the United States Department of Agriculture, covering 100,519 cars of fruit sold during the season of 1922, the value of the fruit being \$183,388,970. Citrus associations sold over 39 per cent of the total, raisin growers 19 per cent and associations selling apples over six per cent of the whole amount.

**C** HERRY growers of Oceana and Mason counties, Michigan, have formed a bi-county association, which will be affiliated in the tri-state organization. Officers elected at their Shelby meeting are: President, Dr. L. P. Munger, Hart; vice-president, Sidney E. Fuller, Mears; secretary and treasurer, D. R. Gale, Shelby. The directors include the officers and Dr. F. Buskirk, Shelby; Benton Gebhart, Hart; J. M. Davis, Mears, and Michael Fitch, Ludington.

The tri-state organization, with which the new organization plans to affiliate in forming a big cherry pool this season, includes growers in New York, Wisconsin and the Grand Traverse region of Michigan.

**AT** A MEETING of the representatives of seven newly organized strawberry co-operative associations in East Tennessee it was decided to organize under the name of the East Tennessee Strawberry Growers' Exchange.

Officers were elected as follows: S. N. Varnell, president; W. H. List, vice president, and Grover Eldridge secretary.

Sales policies for the new organization and marketing plans were discussed at the meeting.



## Introducing the NEW Kelly Cord

### For Commercial Use

*—an extra rugged tire that will stand up under the rough all-around service tires are called upon to give on the farm*

It doesn't need much examination of the new Kelly Cord to convince a car-owner that here is a real tire.

The new Kelly Cord has all the good qualities of the famous Kelly Kant-Slip, plus extra strong sidewalls and a much more massive tread, with reinforced shoulders that add to the life of the tire.

Developed originally to meet the need for a dependable pneumatic truck tire, the new Kelly Cord has been giving such phenomenal service that our dealers and the public alike demanded it in sizes suitable for passenger cars and the smaller trucks.

Now you can get it in all sizes from 30 x 3½ up to 40 x 8.

Whether your driving is done over "hard" roads or rutted dirt roads, the new Kelly Cord will give you unequalled service.

Try one on your car or truck.

**Kelly-Springfield Tire Co.**

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New York





**To Which Group would You Prefer to Sell Your Fruit?**

Which way would you get the highest prices—by offering your fruit to a half-dozen buyers, or by offering it to several hundred active buyers? This is one of the differences between selling through ordinary channels and at auction.

Once a price is bid, the tendency is upward and not downward. Each buyer is afraid that other bidders will get the particular lot he is after and, in this way, prices are usually run up far above the average market prices.

Further, it is our iron-clad rule that the buyer must pay the price bid. With ordinary methods of selling, if a man purchases fruit and later finds that some one paid less, he will go back to the man from whom he bought and demand a reduction.

Other advantages, like being guaranteed your money within 24 hours after sale, are some of the reasons why a large percentage of the country's largest and shrewdest growers and shippers sell through us.

Some eye-opening facts about the fruit selling business are contained in our booklet—"More Dollars for Fruit Growers." A copy is yours for the asking.

**The Fruit Auction Co.**  
Established 1896

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Park Bench  
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LINE INCLUDES FLOWER POTS AND BOXES  
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American Fruit Grower Magazine  
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### Own a Truck

Small Outlay, Easy Terms  
The Ames plan insures full value for your old car and a guaranteed heavy duty truck. Write F. A. AMES CO., Inc., Dept. H Owensboro, Ky.

## An Ideal Combination

Fruit Poultry Bees	{	American Fruit Grower . . . 1 yr.	All Three for \$1.60
		Everybodys Poultry Magazine . 1 yr.	
		Gleanings in Bee Culture . . . 1 yr.	

Mention Club No. 18

American Fruit Grower, 53 W. Jackson Blvd., Chicago, Ill.

# MARKETS AND MARKETING

Edited by C. E. Bassett

THE FLORIDA Citrus Exchange has adopted a new sales plan, which states: "That effort shall be concentrated, first, on sales made in Florida on a cash f. o. b. basis; second, sales in the markets made on an f. o. b. packing house basis to fill definite orders; third, on support of auction markets with continuous but not excessive supplies of specified brands of quality fruit from certain districts, and further to utilize every other legitimate means of securing wider distribution.

"That the direction of the sales department shall be under a permanent sales committee, composed of five members of the Board of Directors of the Florida Citrus Exchange, the business manager, the sales manager and the advertising manager. This committee will meet once a week during the shipping season, with sub-exchange managers and the chief inspector, at which meetings sub-exchange managers shall be authorized by local associations to obligate the latter.

"That assistant sales managers shall be engaged to have charge, under the general sales manager, of all business in certain defined territories covering the entire country and that where necessary such territories shall be divided into districts with division managers in charge.

"That additional salaried offices of the sales department be established throughout the country as rapidly as possible so that the exchange will be directly represented in the sale of fruit in a much larger number of markets, thus providing facilities for enlarged and continuous distribution.

"That it shall be the established policy of the sales department to obtain customers throughout the season for individual packing house brands thus providing for reasonable uniformity of quality, grade and pack, and that the general sales committee shall insist that local associations ship reasonably as directed by the sales manager through the sub-exchanges.

"That the sales policy of the Florida Citrus Exchange is to be aggressive in the establishment of new markets, in the development of markets not now using a preponderance of Florida fruit and in holding markets already on a satisfactory basis, and that there shall be the closest connection between the sales department and advertising department so that the latter can function immediately when new markets are opened.

"That sufficient funds be provided for proper national and intensive advertising, to create the consumer demand adequate to absorb the increasing production of the Florida citrus fruits, and that in order to provide a connecting link between consumers and jobbers, giving widespread and continuous distribution and affording ready outlets for fruit, arrangements shall be made for proper stimulation of the retail trade's interest."

The trucks were fitted out with trays for the apples, so arranged that when the three side doors on each side of a car were opened, the 18 one-tier trays of sample apples could all be drawn out quickly for exhibition purposes. Besides the apples, each car carried a few packed boxes for replenishing the trays. Fresh apples were sent the truck operators by express from time to time from the mid-western storage points of the Hood River people.

The trucks had an arrangement on the roof to carry local advertising for the jobbers and wholesalers. The drivers called on the wholesale and jobbing trade first in making a town and then assisted local representatives of the apple growers by calling on the retail trade with them.

AN EDITORIAL in a recent magazine of the baking trade speaks of the late G. Harold Powell as "master merchandiser of our times" and tells how, while farm papers reviled wholesalers, jobbers and retailers as robbers, Powell became acquainted with them and co-operated with them, and the result was the development of team work in merchandising.

It has been said that the longest range gun is friendship. Certainly it is true that real acquaintanceship with the other fellow leads more toward co-operating with him and less toward reviling him. And G. Harold Powell believed in and practiced co-operation.

IT IS declared that \$5,000,000 worth of Georgia peaches go to waste every year because of no market. These could be shredded, packed into barrels and shipped to ice cream manufacturers and pie-makers throughout the country, according to those interested in the matter.

The matter of by-products was discussed at a meeting at Macon recently. Several new plants will be in operation this season, but California has such a big lead that some growers are afraid that the plants will have to be operated at a loss unless an extensive advertising campaign is put on.

Dr. A. M. Soule, president of the Georgia State College of Agriculture, has suggested an assessment of two to five cents on every crate of peaches shipped out of the state, which would create a fund of \$40,000 a year, he said, for experimental work.

GENTILE BROTHERS and the Federated Fruit and Vegetable Growers, Inc., have been selected as marketing agents for the Georgia Peach Growers this season. J. G. Carlisle, general manager of the Exchange, states that no Georgia peaches will be sold at auction this year. Auction sales were objected to strenuously last year by many of the New York receivers.

THE ORGANIZATIONS which are taking an active part in launching the new Northwest Fruit Growers' commission are: The Yakima Fruit Growers' Ass'n, Yakima; the Wenatchee District Co-operative Ass'n, Wenatchee; the Hood River Apple Growers' Ass'n, Hood River, Ore.; the Spokane Valley Growers' Union, Opportunity, Wash.; the Inland Empire Co-operative Ass'n, Walla Walla; and the Selah Co-operative Growers, Selah, Wash., now being formed.

THE ANNUAL convention of the Florida Grape Growers' Ass'n will be held at Lakeland, in June.

Great interest is being shown in grape culture in Florida, as it is claimed that practically every grape



that is commercially successful can be raised in that state, and the grape growers of Florida are just waking up to the possibilities presented by the industry.

The report on grape culture in Florida, issued by the State Agricultural Division of the United States Department of Agriculture, shows that the grape crop for the season of 1921-22 was valued at more than 10 cents per pound.

**THE USE** of oiled paper wraps in packing apples has increased rapidly in the Northwest the past two years. At least one-third of the commercial crop—or 12,000,000 to 15,000,000 boxes—in the various northwestern shipping sections was wrapped this season, compared with about 600,000 boxes last season. Wrapping is practiced extensively by several large associations and concerns which handle thousands of carloads of apples.

By far the most important consideration leading to its increased use is that oiled paper has reduced and, in most cases, entirely prevented the damage by scald in common or cold storage and in transit. The additional cost over ordinary wrappers is only about two cents per box.

**MORE** than \$2,000,000,000 worth of business was transacted by farmers' business organizations during 1923, according to estimates made by the United States Department of Agriculture. At the close of the year, the department had on its lists the names of more than 9000 active associations. In addition, it had information indicating that there were from two to three thousand associations yet to report. Up to and including November 27, associations to the number of 8313 had been classified by the department as to whether selling or buying enterprises and as to commodities handled. Of the number classified, approximately 90 per cent were primarily engaged in selling farm products, and about 10 per cent in collective purchasing for farmers. Over 30 per cent of the associations were organized for the marketing of grain; over 20 per cent were engaged in the marketing of dairy products; over 14 per cent in the marketing of livestock; and over 11 per cent in the marketing of fruits and vegetables.

It was estimated from the information given by associations reporting volume of business, that the 8313 organizations listed did business to the amount of \$1,700,000,000. Assuming that the two or three thousand associations from whom reports are yet to be received had as large an average gross business as the organizations which have reported, the grand total of business for the year is well above the \$2,000,000,000 mark. Nearly 1000 fruit and vegetable associations report a business of over \$280,000,000.

**EIGHTY-SEVEN** cents per box for oranges and 89c for grapefruit is the total per box charge for packing, advertising and marketing the 1923-24 crop through the Polk County Sub-Exchange, Bartow, Fla., and the Florida Citrus Exchange, Tampa, Fla. This charge was divided as follows: Packing, 70c; selling, 14c; advertising oranges, 3c; advertising grapefruit, 5c. Picking and handling are done for the growers at actual cost.

The Polk County Sub-Exchange, organized in 1909, serves as a clearing house for 25 local packing houses which own real estate, machinery and equipment valued at \$1,785,000; also a crate mill and lumber plant, timber leases, railroad, etc., valued at \$750,000, making a total valuation of \$2,135,000, owned and operated by the growers themselves.

The total number of boxes marketed during the 15 years was 15,624,308 and the amount turned over to the local packing companies was \$31,629,401.

Great difficulty in securing crate material during the war led to the formation of the Highland Crate Company, Lake Wales, Fla., and the purchase of the Avon Manufacturing Company, Avon Park, Fla. The lumber company has timber leases on approximately

50,000 acres of timber which it estimates will last 15 years. Its crate mill has a capacity of about 1,500,000 crates per annum.

The Highland Crate Company acts as a distributing and financing agency for the manufacturing company and its business amounts to half a million dollars annually.

**AS A DIRECT** result of efforts made by J. H. Auvil, president of the Wenatchee District Co-operative Ass'n, a bill has been introduced in both the Senate and House of Representatives at Washington, authorizing the intermediate credit banks of the Federal Farm Loan Board to make loans upon standard varieties of winter apples.

Under the provisions of the Federal Farm Loan Act the intermediate credit banks are not authorized to loan on apples, and crop loans cannot mature in less than six months from the time they are made.

The amendment which has been introduced into the Senate by Senator Wesley L. Jones, provides "That paragraph 3, of sub-division (a) of section 202 of the Federal Farm Loan Act, as amended by adding at the end thereof, a new sentence to read as follows: 'As used in this title, the term staple agricultural products includes standard varieties of winter apples.'"

**IN A RECENT** contest conducted by cranberry growers of Ilwaco, Wash., the name "Washington Mistkist Cranberries" was selected by the judges as the best name submitted, and the products of the famous Pacific County cranberry bogs will be marketed under this name in the future.

**THE CALIFORNIA** Prune and Apricot Growers' Ass'n of San Jose, announce new policies. These involve an export sales department, the introduction of a salad oil by-product, and a more intensive advertising campaign, one object of which will be to create a demand for prunes in cartons. The general manager and the sales manager will shortly make a trip through the east, visiting the trade handling their products.

**THE REPORT** of the International Apple Shippers' Ass'n shows 6242 barrels and 35,290 boxes of apples exported from the United States and Canada during the week ending April 26. This is compared with 420 barrels exported during the corresponding week a year ago. Totals show 3,186,330 barrels and 5,364,184 boxes for the season to that date as against 1,681,956 barrels and 3,245,233 boxes to the same time a year ago.

**UNDER** the heading, "Even Americans Curtail Their Appetites in Berlin," a recent dispatch tells how expensive it is for Americans who have to take their meals at hotels and cafes to indulge in grapefruit, pineapple or baked apple.

It is reported that a grapefruit but little larger than an orange costs a dollar or more, a slice of pineapple 75 cents, and an apple "about the size of a walnut," without cream or sugar, costs 50 cents.

And yet Americans at home, who have the confirmed fruit-for-breakfast habit, complain about the prices they pay for their morning dish of vitamins!

**A DECISION** to petition the Federal Government of Canada to impose a luxury tax of 10 per cent in addition to present taxes upon vegetables and fruits imported into the country was made at the Annual Convention of the Ontario Vegetable Growers' association in Toronto.

Without a dissenting vote, the resolution was passed, which said in part: "That we realize from reports from all parts of the province that our farmers, especially those engaged in supplying vegetables during the winter and early summer seasons, are gradually being driven out of business by the importation of cheap, field-grown products of the semi-tropical parts of the United States."



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**SPEED WAGON** long-life features distribute depreciation charges over hundreds of thousands of miles.

**SPEED WAGON** strength and brute stamina cut maintenance costs to almost nothing.

**SPEED WAGON** power and roadability overcome the hazard of bad roads and weather.

**SPEED WAGON** capacity (500 to 2500 pounds) enables the handling of profitable pay loads.

**SPEED WAGON** completeness,—pneumatic cord tires, demountable rims, electric starter, electric lights, ammeter, speedometer, battery, electric horn, etc.—saves the usual cost of "extras."

Chassis price is \$1185 (at Lansing, plus tax) Twelve standard bodies, all as relatively low in price.

The Speed Wagon is designed and manufactured in the big Reo shops,—not assembled;—and serviced by more than 2000 Reo dealers.

**REO MOTOR CAR COMPANY • Lansing Mich.**

## Preparing for a Big Strawberry Crop

(Continued from page 10)

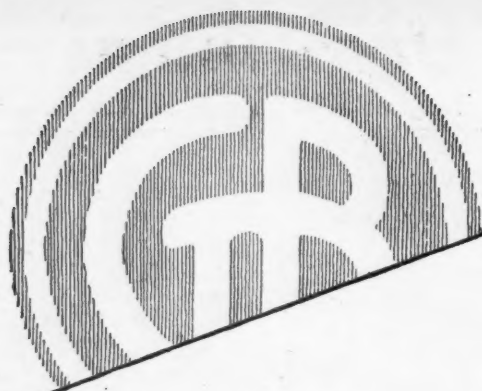
quent plan is to keep ahead of the disease by sanitation and spraying.

**6. Other Steps to Take.** In selecting varieties for planting, avoid types which are known to be especially liable to spot and rot diseases, keeping in mind all the time, of course, that yield and quality characters must also be preserved. Set plants in well-drained soil; for the moisture from low or poorly-drained soil favors fungi causing the diseases mentioned. Further sanitary measures involve a systematic cleaning up around the packing shed; rotten and moldy berries should be destroyed forthwith. Likewise all rotten berries left in the field only add to the source of trouble for the next season. Daily close picking not only keeps the berries of even grade but also may tend to regulate the water content of the berries and may tend to keep them from extreme

succulency. Avoid holding berries over from one day to the next; rush them into refrigerated cars as soon as possible. Wagons loaded with berries should be kept in the shade. If, in setting, so-called "certified plants" are purchased, it is of course advisable to make certain that the plants received are worthy of the certificate they bear.

Ever since the February issue of the *AMERICAN FRUIT GROWER MAGAZINE* I have wanted to express deep pleasure in the great value of your magazine. Your article in the February issue on selecting a sprayer told me what I should look for when purchasing a power sprayer, which I had to do this season. The article was in time to help a purchaser decide what he wanted. And in the April issue, the article on pollinizing apples as well as other fruits was a regular treatise on the subject such as I had never understood previously. Keep up the good work, please.—Fred Satterthwaite, Pennsylvania.



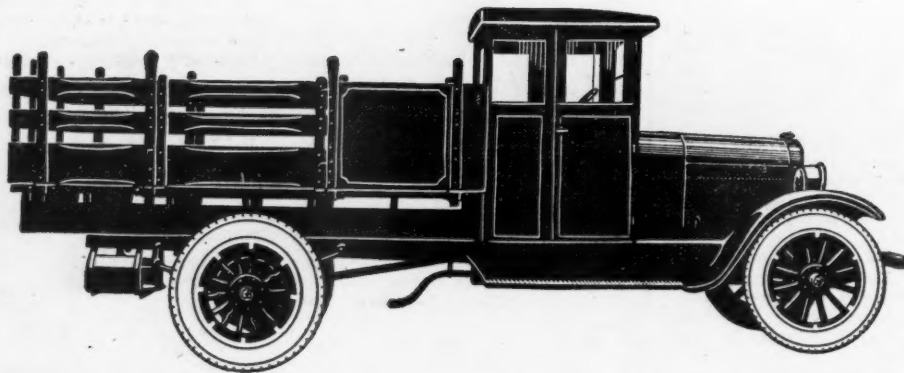


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Massive construction means dead weight. Dead weight in transportation is costly. Graham Brothers eliminated it and gave the world a truck that really provides low-cost service.

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# GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

### Development of Motor Truck Transportation

(Continued from page 8.)

They had the advantage of paved roads, of immediate proximity to service and maintenance facilities, and of the courage that comes from being closely associated with one another. Not so the farmer. Faced with the prospect of driving over poor roadbeds, if he ventured very far afield, and skeptical as to the possibilities of using haulage of this kind except for the transportation of completed crops from farm to market, the farmer was hesitant to take up the motor truck as a part of his farm equip-

ment. He preferred the team—good old stand-bys—for the heavy hauling, and the tonneau of his passenger car for the lighter work.

#### Fruit Farmer Helps to Open the Way for Motor Trucks on the Farm

It was the specialized farmer—and prominent among this class, the fruit farmer—who opened the way for the motor truck on the farm. The reason for this is not difficult to discover. Specialized farming invariably has meant farming with machinery upon a scientific basis. Just as departmentalized merchandising has meant particular equipment in contrast to the old general store, so the farm devoted to the raising of one

particular crop has found the need for highly developed methods and appliances. It has demanded them, in order to assure a maximum yield from its acreage and a quality one as well.

This has placed the specialized farmer in a frame of mind to see the possibilities of motorized haulage, such as do not always open themselves to the general farmer, for the specialized farmer has found transportation a definite factor in his success. He has seen its proper place and relation as the result of a scientific analysis of his entire business from planting to the time he receives his check for the crop.

Likewise, specialized farming almost invariably has for its objective,

a crop that is all bound up in a very particular time element. In other words, every crop ripens and must be harvested, stored or sold within a pretty definite period. The general farmer has a small quantity of several crops, maturing at intervals, over several weeks, and therefore offering a rather minor transportation problem, because the average load is smaller and the time for hauling strung out. The specialized farmer must haul within a given time limit, in most cases, and must haul a large sized quantity.

Transportation is essential to successful specialized farming. Particularly is it essential to fruit farming, a class of agriculture involving huge waste unless the fruit is marketed within a short space of time after it leaves the orchard. Even though we are storing vast quantities of fruit in cold rooms, there are few fruit farms with cold storage facilities on the premises. Almost without exception, the harvesting of a fruit crop calls for immediate haulage away from the farm.

#### The Reason Why More Fruit Growers Do Not Have Motor Trucks

It would seem, therefore, that there should be approximately a 100 per cent roster of truck owners among fruit farmers. Available statistics, however, place the average at less than one-half. Why? Largely because the fruit grower has not been entirely convinced that a motor truck is an economical investment for him. There is little question but that he recognizes its value at harvest time—quite possibly he uses trucks to haul his crop away. But they are someone else's trucks, hired for the harvest season and naturally at a profit to the truck owner. The grower himself has felt that this was economical, even with an extra profit to consider, over owning his own truck. He has in most cases been approached upon the subject of motor trucks from the angle of hauling the complete crop to market—nothing else. And properly, he has questioned the true economy of purchasing a piece of equipment for a few weeks' yearly use with the rest of the time spent in idleness on the garage floor.

This has been a case of misjudgment, both on the grower's part and upon the part of the truck salesman. It has been the old story of the path of least resistance, because crop haulage is the first thing that enters the mind when a fruit farm truck is mentioned.

As a matter of fact, the crop transportation is only one of a number of profitable uses to which a fruit grower can put his motor truck. While it probably should be the determining factor in a decision to equip the fruit ranch with a truck, it should also be considered as a part use for this equipment and should bear only its true proportion of the expense of the truck in the grower's calculations.

In this article, the effort has been made to picture in brief the development of motor truck transportation particularly with reference to the fruit grower, and to point out from the historical standpoint, why it is that the motor truck has not extended further in the service of fruit growers.

In the next article, the discussion will be confined to the uses that a fruit farm can find for a motor truck, particularly those outside the hauling of the completed crop to the market or shipping point, and the reasons why, with such uses possible, at a saving of both time and money, a motor truck is a real, economical investment for a fruit grower—one that will lighten his labors, decrease his anxieties, and at the same time show a substantial yield in profits on the yearly account book.

#### No Danger

Coal Merchant: "Quick! Quick! My coal yard's afire!"

Fireman: "Oh, is it? Well, if the stuff be the same as you sold me to'other day, there ain't no 'urry!"

—London Humgrist.



# The Orchard Home Department

## Thirty Days on Southern Seas

by Mary Lee Adams

IF YOU'VE stuck close to your farm and have never been to sea, you may wonder how life is lived aboard ship. Here's a British Liner just leaving for a 30-day cruise in the West Indies. Come with me aboard this strange dwelling which will soon seem like home to us.

How many stories up and down it is! What long, long corridors and innumerable doors! We're sure to get lost. Be careful never to allude to your "room on the first, second or third floor." That's a grave breach of marine etiquette. It brands you at once as a land lubber, and though that's exactly what you are and always, quite unashamedly, have been, no sooner have we embarked than it becomes a despicable estate not comparable in esteem to any old sea-dog. Remember—your "state room is on A, B or C deck."

All of us, without exception, whether we be Neptune's Daughter or Uncle Reuben from Iowa, speak glibly of bow and stern, forward and aft, port and starboard, even venturing a guess that we've a little list to "leeward," though to be sure some of us would be hard put to it to demonstrate whether we mean right or left, front or rear, coming or going.

### Ring for the Steward

On entering your state room, don't be dismayed by its size and apparent lack of accommodation. It's simply marvelous how compactly comfortable it is. You'll find a place for everything. If you don't understand all of the thing-a-ma-jigs, a whir of your electric bell brings a steward whose dearest interest in life would appear to be explaining the mysteries of lights, ventilation, cupboards, baths, curling irons, etc.

How are you going to endure the boredom of day succeeding day when "the sky and the sea, the sea and the sky, lie like a load on the weary eye" and there's nothing but water in sight? That's one of the secrets of the sea. You forget the passage of time. Before sailing you fear there'll be nothing to do. After reaching home again, you realize that even those things that should have been done were left undone, and your normally sensitive conscience hasn't even pricked.

### To Be or Not to Be Seasick

It's safe to guess that uneasiness as to passing the time is secondary to uneasiness as to what kind of sailor you may prove to be. Let it be truthfully admitted that the most dread monster of the deep is seasickness. Shipwreck is kindly, indeed welcome by comparison. It affords the thrill so lamentably lacking in the ignominious ocean malady, and it supplies an almost sure cure for your woes. Trying to get into a surging lifeboat concentrates one's thoughts amazingly, and, if the worst comes to the worst, a drowned man is never seasick.

But why be seasick? A little applied Christian Science or Coueism helps a lot. Then there's good old Mother Sill's Remedy, with which I'm sure Noah stocked the Ark, and there are the kindly stewardess and gallant ship's doctor full of experience, wisdom and mercy for the sufferer.

Naturally those who over-indulge in food or drink, or who expose themselves recklessly to the deceptive tropical sun, may rue the day of reckoning. There's the temptation to be resisted of eating freely of every variety of tropical fruit. The voyager's safest indulgence is the savory papaw, paw paw or papaya, which is so rich in pepsin that the natives claim it can digest a horse.

### Eating Aboard Ship

A great load of food accompanies us. There are 700 passengers and

crew to be fed. The dining room steward says the ice box is as big as a large public hall. It must be. We start from New York with every bit of ice cream to be used on the entire trip and, far south, where a January day is hotter than our Julys, ice cream is in huge demand.

One may, without extra charge, eat seven times a day. Even you, who hold up your hands in horror, will be glad of the "settling" cup of black coffee brought you before breakfast by your room steward. Unless very unfortunate, you'll eat a hearty breakfast and along about 11 o'clock that hot beef broth offered at your steamer chair, has an appetizing fragrance. Luncheon is a matter of course and of courses, and as for four o'clock tea, the deck stewards have barely set the tables and placed the little stands with sandwiches and cake, before they are stormed by men, women and children. The late comer gets half a cup and no cake.

Dinner is the closing meal of the day, with sober early-to-beds but, if you dance on deck until late, a sandwich before retiring is welcome. So all seven refreshments are accounted for. You'll surely hear some people criticising the food, "Nothing fit to eat." Then you'll hear the experienced voyager remark that the fussers are always those who are not used to much at home.

### Feeling at Home at Sea

You're getting friendly with the sea by now. Even a stiff blow when the prow dips to the depths and the stern is lifted to the zenith, serves but to confirm your confidence in the staunchness of the vessel. She seems to enjoy bounding through the waves. The Captain has a comfortable air of assurance and the crew are unconcerned as they secure madly flapping storm canvas. Their blue figures, poised in a row on the rail, form a huge poster against the flat gray sky. You wonder again why sailors love to go barefoot. All day they paddle about the deck without shoes or stockings.

As the storm blows off, the sea resumes the unbelievably brilliant and varied blues of these southern waters. And now, instead of boredom, you have hardly time to rest in your chair between hurried trips to the rail. Here goes a flight of flying fish skimming the surface like wind-blown silver leaves. Did you see that shark go by? No, you missed him, but you can't afford to lose this drove of porpoises racing the ship.

Here they come, hundreds upon hundreds of the big, playful fish; rank upon rank following the ship for miles; rearing eight feet straight up on their tails, leaping high out of the waves, coming down with a spanking whack that resounds to the highest deck, darting off and rushing back in the most joyous sport imaginable. You get so excited watching their amazing antics that, when they leave at last, you try to keep up interest by swearing you see SOMETHING spouting off there to the left (I beg pardon—to port.) Probably it's a whale. It certainly is SOMETHING spouting.

### Stars and Divers

Sunset comes in a glory of rose and gold. Follows moonrise, when the waters gleam with brilliant phosphorescent foam tossed from our prow. And oh! just look. Over there, low on the horizon, hangs the far-famed Southern Cross. We've always dreamed of its beauty and, like many a dream, it is somewhat shattered in the realization. It takes an astronomer's imagination to detect the cross, owing to it being set askew in the heavens and to the center star being faint and out of alignment. One who has pictured it as a perfect golden

cross such as surmounts some great cathedral, will easily remain loyal to the Great Dipper of our northern skies.

Not mid-ocean alone seethes with interest. There are ports where the vessel is beset by boatloads of divers who will plunge into the transparent waters a thousand times if enough people will toss them coins. These divers show splendid bronze figures little outnumbered by an apology for conventional raiment. If by ill luck the so-called garment fails to keep in touch with the wearer, there is no embarrassment and short delay, for ocean's depths serve one, so at home in them, as a convenient dressing room.

There's no height from which these men will not dive and no depth to which they will not cheerfully sink for a modest reward, but they are so skillful that any coin is usually scooped up before it goes far. There is more trouble when a big bunch of divers leap at once from many boats. Down, down they go until nothing can be seen but a tangled gleam of light-colored, paddle-shaped foot soles as they plunge in inverted position. The successful one rises with coin held aloft for the inspection of our company hanging over the rail of the promenaded deck. He then stuffs it into his mouth along with an astonishing number of previous gains. These people must have jaw pouches like squirrels.

Girl divers are as lovely to look upon as polished bronze statuettes. Their feats are not so spectacular as the men's, but their beauty elicits a generous response from the tossers of small coins, and the bottoms of their tiny boats are soon glittering as from a haul of silver fish. These graceful brown girls may be rowed out by sedate men clad in one-piece costumes of bright pink calico trousers. It is a colorful scene, the dozens of small boats, the dusky divers, the transparent cobalt water. You'll remember this some gray day on the farm.

### Spare Your Host's Feelings

You are on an English boat. For the love of John Bull try to avoid shocking the prejudices of your table steward. Try to do without butter at dinner. Try your best not to yield to the temptation of asking for coffee with your lunch. Ask you ever so humbly you won't get it anyway until the meal is over, so why offend a fellow creature? Try again not to make a face when you drink that coffee. It's the very best English brew and not actually flavored with quinine. Pretend, if possible, that you prefer your toast cold after a good airing in a little rack made for that purpose. Your special waiter, Tutt, (any relation to Tutt and Mrs. Tutt of the Saturday Evening Post?) will appreciate your forbearance and good breeding according to age-old English standards.

And these English do serve with a heartiness seldom found in our experience. The only criticism one can make is that some of the crew look sloppy according to our notions of decorum at sea. James, our bath steward, is jaunty at all hours in an aged and porous undershirt. When he confides that he gets far less pay than an American in his position would get and that he is required to pay for his own laundry, we are inclined to forgive his sartorial lapses.

It's hot too, down on his deck, and the poor thing is at everyone's beck and call from 5:30 a. m. until 11 p. m. Even at the sacred tea hour, when the ship's barber closes his shop and turns your husband away unshorn until the daily rite is accomplished, and while other stewards and stewardesses drink and chat around the tables of the second class dining room,

the poor bath steward may be seen precariously perched on the rim of one of his tubs, sipping or gulping the boiling beverage.

We pity James, perspiring and rushing about for 18 hours a day, and hardly know how to accept his heartfelt commiseration in the midst of a fairly strenuous week when the passengers are landed daily at various ports. "You wouldn't get the English to stand for such a rush," says James, "When you get home you'll need a whole month to rest up." After that we feel better about poor James.

### Care-Free Cruisers

A care-free company goes cruising. No one pelting off to establish fresh business connections. Just pleasure seekers or rest seekers ready for any fun that may turn up. This makes for easy companion ship, and soon you are lined up with your particular clique for games of all kinds. You are concerned to know whether you'll come out ahead in the bridge whist contest or the Mah Jong, or in the deck games played on the open hurricane deck where you can burn the skin off your face before you know it. There's a fancy dress ball with prizes for the best costumes, and the swimming pool where one may take a delightful dip and a few strokes in the continually renewed water.

There's horse racing on deck. Excitement grows wild as the backers of wooden dobbies urge their steeds forward; but for sheer fun, watch a pillow fight between two men mounted astride a greased pole lashed to the deck uprights. They need the mattresses thoughtfully placed under the scene of combat. The best they can hope for is to hang helpless, head downward with legs locked around their slippery mount, while not a single shouting spectator lends a hand to put them right side up.

### Lovers and Gossips

In idleness and gaiety, friendships and romances flourish. Young officers make wonderful dancing partners and are so appreciative of a pretty girl. The latest summer styles are worn and permanent waves grace long locks and bobbed-haired lassies. Even the sea wears them, and nothing is quite so impermanent as the home-made curl in an ocean breeze.

With no real business on hand, gossip runs rife. "My dear! See that demure girl over there. Well, last night in the saloon—" "You don't mean it. How shocking!" But this shocking girl spent the entire evening sick in her berth. Or "Whisper. Did you know there's a Catholic priest on board traveling with a woman?" "Holy horrors! What's the name?" "The name is O'Reilly, Dennis O'Reilly."

And there, well within hearing, gasps the decorous Mrs. O'Reilly, wife for the past 30 years of the respectable Episcopal minister who is her devoted husband. Then a heavier masculine tone, "Say! D'you know what that head-jangler does for a living? She's a snake charmer. Fact." Interesting if true, but we've heard WOLF cried too often. Pooh! She couldn't charm a snail. When we start gossiping it's about time to stop, and anyway here we are slipping into the New York dock. How good to be home. It's nice to have been together these happy weeks. Good-bye and Good Luck.

### Lilacs

Amid the city's rush my steps I stay  
To buy a bunch of lilacs from a boy.  
What wealth is mine for those few coins  
I pay,  
Sweet memories of home and childhood's joy:  
My mother's gentle face as me she  
kissed  
Where lilac blossoms bloomed beside  
our door.  
Dear flowers of home, I see you through  
a mist  
Of tears, yet I am gladder than before.  
—Maud Frazer Jackson.



# Apples Pay Bigger Profits When You GRADE and PRESS!

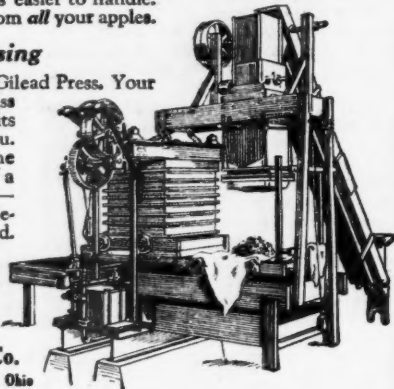
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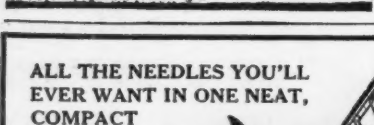
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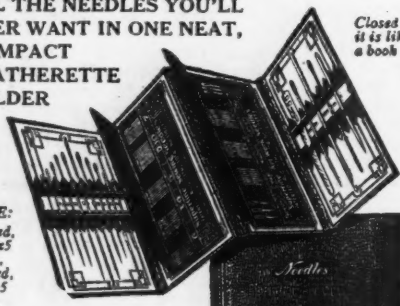
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EVER WANT IN ONE NEAT,  
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LEATHERETTE  
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in.  
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- 2 Medium Cotton Darners
- 2 Fine Cotton Darners
- 15 Silk and Cotton Darners
- 15 Embroidery Needles
- 3 Chamille Needles
- 1 Steel Tape or Ribbon
- 1 Punch Work Needle
- 2 Fine Wool Darners
- 2 Medium Yarn Darners
- 1 Steel Bodkin

## CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL



## Rug and Carpet Cleaning

**CARPETS** and rugs that need more cleaning than can be given them by broom or vacuum sweeper often present a real problem to the farm housewife who does practically all of her own cleaning. Colors need to be freshened, stains and dinginess to be removed.

Soap and water are the best cure. Very few rugs cannot be washed, though water must be used sparingly on pile rugs. Those which will not stand washing are the ones with non-fast colors or with loosely-woven, heavily sized foundations. The better the rug, the better the results in washing.

### Rag Rugs by Machine

Rag rugs are desirable from the washing point of view as they may be put in the washing machine and given a thorough cleaning in that way. If there are some obstinate soil spots, use the scrub brush on them. Rinse the rugs well. The best way to accomplish this is to hang them on the line and turn on water from the garden hose. Rinse on both sides, then reverse the ends and repeat the process. Leave on the line to drip, and they will be flat when dry. In the absence of a washing machine, lay the rug flat on a porch floor and scrub with a brush.

With pile rugs, more care must be taken. Here the pile is the part to be cleaned, and care must be taken to keep the foundation from getting water-soaked. First clean the rug thoroughly with a broom, or vacuum cleaner if you have one. Spread on a flat surface—a table or work bench is suitable. Then with a heavy white soap lather and a stiff brush, work the lather into the pile, but no farther, using a circular motion. Use as little water as possible on pile rugs as water is likely to cause shrinkage and running of colors.

Perhaps it would be well to make a carpet cleaning compound to use for the lather. For this, shave half a pound of soap and boil in a quart of water until dissolved; then add a gallon of hot water and one ounce of salts of tartar; mix thoroughly. Use a stiff brush and scrub the carpet with the mixture, which should lather freely and clean the carpet without making it very damp. Clean a breadth, wipe hard with a cloth wrung out of cold water. If there is much green in the carpet it may be wise to put a cup of vinegar into the rinse water.

### Change Rinse Water

Another cleaning compound is made by dissolving four ounces of good white soap in four ounces of boiling water; when cool add five ounces of ammonia, two and one-half ounces of alcohol, two and one-half ounces of glycerin and two ounces of ether or chloroform; bottle and cork tightly to prevent evaporation. To clean a carpet, add a teaspoonful to a pail of tepid water and wipe the carpet with it; follow with clean water. Two tablespoonfuls to a pint of water will remove obstinate stains. Change rinse waters frequently after any cleaning.

There are several methods of freshening and brightening rugs without actually washing them. (a) A simple process is to sprinkle common table salt over the carpet and follow with a careful sweeping. Spots and stains should first be removed. (b) After a careful sweeping, wipe the carpet over with vinegar and water in the proportion of a teaspoonful to a pail of water. Wring a cloth out of the solution and wipe the carpet. Do not use the car-

pet until it is dry. (c) Wipe the carpet with a cloth wrung out of warm water and ammonia or kerosene, using one teaspoonful of ammonia and one tablespoonful of kerosene to one gallon of water. Change the water frequently. (d) Wipe carpet with cloth wrung out of salt water to remove dust and brighten the colors. (e) Sweep with broom dipped in hot water containing a little turpentine. Do not have the broom too moist. (f) Wiping the carpet with an alum solution will brighten the colors.

### To Remove Carpet Stains

Whitewash stains may be removed by putting a few drops of carbonate of ammonia in warm water and applying carefully with a cloth. Sticky spots may be removed with salt and alcohol. Remove oil spots by absorption, using fuller's earth, blotting paper, salt, etc. To remove soot, cover with salt, let remain some minutes and then sweep.

To remove ink stains—If wet, pick up as much as possible with blotting paper; then remove with milk, or common sand soap. Or, first pour clean cold water on the spot, if it is fresh, taking it up again with a spoon which is pressed down into the pile of the carpet. Lay a cloth around the spot so it will not spread; then apply a weak solution of oxalic acid, sponging it up quickly. If the color of the rug is altered by the acid apply ammonia water.

If rugs are kept clean they will wear much longer, as well as retain their beauty. Grit gets imbedded in the nap and if left there, cuts the fiber. Then, too, dirty rugs and carpets harbor germs.

## Making Good Coffee and Tea

**THE FIRST "aid"** to good coffee is a percolator. No housewife who has ever used a percolator would want to go back to the old-time coffee pot; neither would the man of the house who has tasted coffee made in the new way. The coffee is clear and delicately flavored, for the grounds are all in a separate compartment and the boiling water merely filters down through them. The grounds are also easily removed from the percolator. Then, too a shining percolator is an addition to the breakfast table, which could never be claimed for the coffee pot.

With the ordinary coffee pot it is necessary to have the water boiling before starting to make the coffee, but with the percolator the coffee may be started with cold water, the "perkling" system insuring even better results than in the other way. If you must continue in the old way, remember that you should never boil the coffee. The flavor becomes bitter, and unhealthful products are developed in the coffee which can be practically eliminated through proper making. Have the water boiling and steep, not boil, for about three minutes for coffee. The coffee should be finely ground and of good quality.

### The Making of Tea

To make tea, have the water boiling and the pot hot and pour the boiling water into the pot in which the tea has been put. Let stand for about two minutes and then pour the tea out into cups. Never let the tea stand too long before pouring, or the same thing happens as when coffee is boiled.

Perhaps the ideal method of making tea is to have the water boiling in the

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pot and then drop in a perforated silver ball filled with the tea leaves for not more than two minutes. Then remove the ball and the tea is ready for serving.

The housewife should not forget that tea usually calls for dainty service in china and silver, and also the right accompaniments. Some persons prefer sugar and cream, some either one without the other, while still others want a slice of lemon or orange, with possibly a whole clove.

Good cream is a real essential to delicious coffee. If the coffee is delicately flavored and plenty of cream is used, sugar is usually not desired. Only bitter coffee has to be "sweetened up."

A final point is this—never leave either coffee or tea stand in the pot from one meal to the next. Empty the pot and wash it after each meal, keeping both inside and out immaculate. Then make fresh coffee or tea

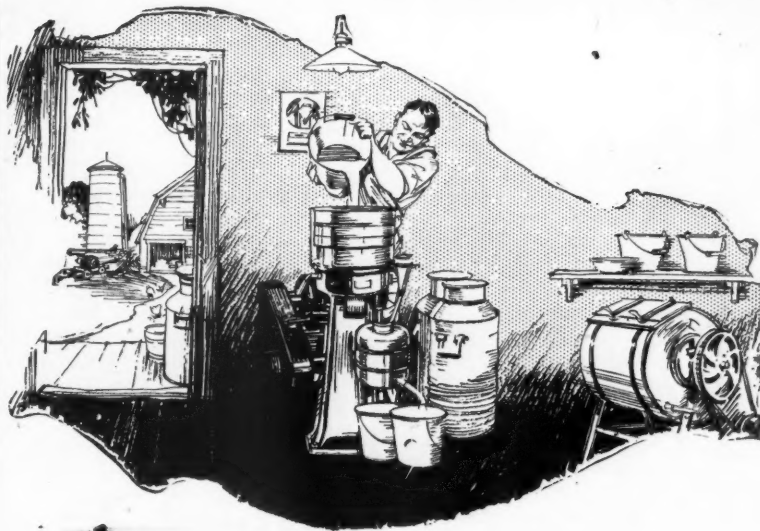
as desired. If the proper amount is made each time there will be little or no waste in this way.

### To Remove Wrinkles

TO REMOVE the wrinkles from silk waists, such as georgette or crepe de chine, which have become mussed from lying in a drawer or from being packed in a traveling bag, shake out, and then hang over a hot radiator or stove for a few minutes. The wrinkles will all vanish in short order.

### Handy Mop Wringer

WHY PUT your hands in soapy mop-water when you can buy for a small sum a little contrivance which fastens on the mop holder and wrings the cloth mop merely by the turn of a crank? It is an ingenious device, and will be found a great convenience in the farm home.



## Oranges Cheap This Season

WHY NOT satisfy the family appetite for oranges this season when sweet juicy oranges may be had at a price considerably below the usual one for this delicious fruit? Don't let them hunger for fresh fruit while waiting for berries, cherries and early apples to ripen. Oranges may be served in many ways, including salads, beverages, cocktails and desserts. They are delicious fresh without any "frills," with the possible exception of sugar, which can hardly be classed as a "frill." They may be served in halves or whole with the lid taken off to be eaten with a spoon. An orange is appetizing when placed on a small plate with the sections joined by a slim band of bright orange peel. They may be peeled and served with sugar or shredded cocoanut and sugar. Then use the peels as candied orange peel. Oranges are richer in vitamins and minerals than many fruits.

#### Fruit Cup.

- 2 oranges
- 2 bananas
- 1/2 c. powdered sugar

Peel and cut the oranges with a sharp knife. Slice the bananas with a silver knife to prevent darkening. Add sugar and cocoanut. Serve in fruit cups or baskets made from the orange peel as either a simple dessert or an appetizer at a more formal dinner.

#### Orange and Date Salad.

- 3 oranges
- Walnut meats
- chopped
- 1/2 t. salt

Pare oranges and separate sections. Remove stones from dates. Whip cheese until light and foamy. Add chopped nuts, salt and paprika. Shape into balls and stuff dates. Arrange orange sections and dates on bed of crisp lettuce leaves.

#### Orange Jelly.

- 1 envelope gelatin
- 1/4 c. cold water
- 1 1/2 c. boiling water

Soak the gelatin in 1/4 c. cold water, then dissolve in boiling water and strain if not clear. Add orange juice, sugar and lemon juice. Pour into a wet mold lined with halves of peaches or apricots, or in small individual molds with one piece of fruit in each. Serve with whipped cream.

As a salad, the orange jelly may be unmolded from individual molds unto a crisp lettuce leaf. Serve with cream mayonnaise or fruit salad dressing.

#### Orange Marmalade.

Use 6 medium-sized oranges and 3 lemons. Wash, quarter, remove seeds and slice very thinly. Measure the sliced fruit and mix with 1 1/2 c. of water for each cup of fruit. Let the mixture stand for 24 hours. Boil for 1 hour, then let mixture cool. When thoroughly cooled, add 1/2 c. of sugar for each cup of the mixture. Boil again for 1 hour. Pour into jars or glasses and seal, or when cold cover with paraffin. This recipe makes four half-pint jars. The jelly is stiff with fruit and can be cut prettily. The relish will not be bitter when prepared in this way.

#### Citrus Marmalade.

Use 4 large oranges, 2 grapefruit, and 3 lemons. Wash, quarter, remove seeds and slice thinly, or run through a food chopper using the coarse cutter. Add 6 quarts of water and boil for 15 minutes. Let stand 10 hours, and again boil 15 minutes. Add 4 lbs. of sugar and boil to jelly test. Pour into jars or glasses and seal, or when cold cover with paraffin. This recipe makes five half-pint jars of marmalade.

#### Fruit Salad.

- 2 oranges
- 3 bananas
- 1/2 lb. white grapes
- 4 slices pineapple, cubed
- Small stalk celery
- 10 walnuts

Prepare and mix fruit, nuts and celery and serve with fruit salad dressing or merely add sugar to sweeten. Whipped cream makes a delicious dressing for fruit salad. It may be served on lettuce or in orange cups.

#### Orange Cake Filling.

- 1/2 c. sugar
- 1/4 t. flour
- Grated rind 1/2 orange
- 1/4 c. orange juice
- 1/2 t. lemon juice
- 1 egg
- 1 t. butter

Mix sugar, flour, fruit juices, grated rind, egg slightly beaten and the butter in the order given. Cook 10 minutes in double boiler, stirring constantly, and

cool before spreading. Plain cake with an orange filling is a real treat.

#### Orange Icing.

- Whites of 2 eggs
- 1/2 c. confectioner's sugar
- Rind and pulp of 1 orange

Whip eggs to stiff froth, add sugar, a little at a time, until stiff enough to spread. Whip in pulp and rind of orange. Orange coloring may be used if desired—use a vegetable coloring as it is harmless.

#### Orange Charlotte.

- 1/2 envelope gelatin
- 1/4 c. cold water
- 1 c. boiling water
- 2 T. lemon juice
- 1 c. orange juice
- 1 egg white
- 1 c. sugar

Soak gelatin in cold water 10 minutes, and dissolve in boiling water. Add sugar and lemon juice. Strain, cool slightly and add orange juice (or other left-over fruit juices). When mixture begins to stiffen, beat well, add whites of egg beaten stiff, and beat all thoroughly. Turn into a mold lined with strips of stale cake or lady fingers. Unmold and serve plain or with whipped cream.

#### Fruit Salad Dressing

- Juice of 3 lemons
- Juice of 2 oranges
- 2 eggs
- 1 1/2 c. sugar

Whip all together thoroughly. Put in double boiler and cook until thick, stirring constantly. When ready to use, add 1 cup of cream whipped. This dressing will keep for some time, being ready for use when wanted.

#### Marshmallow Salad.

- 4 oranges
- 2 bananas
- 1 tin marshmallows
- 1/2 can sliced pineapple
- apple
- 6 walnuts

Cut oranges, bananas, pineapple and marshmallows in small pieces. Add chopped walnuts and mix all together with fork. Serve on lettuce leaf with fruit dressing. A candied cherry will give a touch of color.

#### Orange Tapioca

- 1 quart hot water
- 1/4 c. minute tapioca
- Pinch of salt
- 4 T. sugar
- 1 T. lemon juice

Cook tapioca, sugar and lemon juice in water, to which salt has been added, for 15 minutes in double boiler. Stir frequently. Pour this over the oranges, which have been peeled, divided into sections, cut into small pieces and sweetened. Serve cool with whipped cream.

#### Candied Citrus Peels

Save all the orange, lemon and grapefruit peels and throw them into a large crock filled with salt water, about 1 cup of salt to a gallon of water. Keep the peels below the brine. When it is full, wash the peels in two or three waters, scrape out the stringy part but leave the white pulp. Simmer gently, changing the water from time to time till the salt flavor has been eliminated. Lay a number of the pieces together and cut into very narrow strips; cook in thick syrup made by adding 1 c. of water to 4 c. sugar, until peels are transparent. Lay on buttered plates in a slow oven with the door open, and sprinkle with granulated sugar. Turn once or twice, and as soon as syrup is absorbed, roll in granulated sugar and put in cans or boxes. This is excellent for fruit cakes, plum pudding, bread or rice pudding. If the strips are to be used as candy, add a little lemon juice to the syrup to avoid a flat taste.

#### Measurements.

- 1 c. equals one cupful.
- 1 t. equals one teaspoonful.
- 1 T. equals one tablespoonful.
- 1 lb. equals one pound.
- All measures are level.

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## "Dinner is ready"

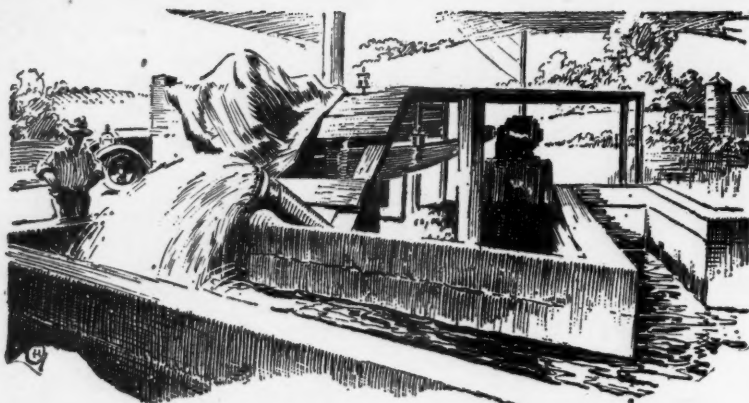
The modern homekeeper frequently serves the new Beech-Nut Prepared Spaghetti. She knows that it is all cooked and seasoned with a delicious cheese and tomato sauce. She just heats it for ten minutes or so—and dinner is appetizingly ready. Order a few cans the next time you buy groceries. You will be delighted with it.

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with delicious cheese  
and tomato sauce





## On the threshold of the Electrical Farming Era

Many farmers of the west receive electric service. They pump irrigation water electrically, and because they need much power for this purpose alone they find it profitable to install electric labor-saving devices and lights in their buildings.

But in other sections several million farmers are without electricity. They live in sparsely populated districts where conditions are at present against the profitable use of electric power.

Agricultural and electrical engineers believe that if all the conditions are known, farming and electricity can be adapted to each other so that human and animal labor can largely be displaced by electric motors.

To study this problem a National Committee is assisting in the organization of State Committees. Groups of farmers are receiving experimental electric service. They are keeping accurate comparative records of production costs under electrical and non-electrical conditions. Farm-paper editors and state agricultural colleges are cooperating with these state groups.

Thus the needed information is being collected under the conditions of actual practice. As practical results are demonstrated the kerosene lamp will give place to the electric light and animal and human muscle to electric motors and push-button conveniences.

The National Committee in charge of the work is composed of economists and engineers representing the American Farm Bureau Federation, the Departments of Agriculture, the Interior and Commerce, the Power Farming Association of America, the American Society of Agricultural Engineers and the National Electric Light Association.

A booklet has been published by the Committee. It will be sent on request free of charge. Read it and pass it on to your neighbor. Write for it either to Dr. E. A. White, American Farm Bureau Federation, 58 E. Washington Street, Chicago, Ill., or to the National Electric Light Association, at 29 West 39th Street, New York City.

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MR. C. E. BROOKS

### Orchard Tillage

(Continued from page 15)

kind must depend upon the region, to be cut two or three times each season as a mulch. The cut grass should never be removed for hay. There may also be an occasional orchard on deep moist soils where, even on level land, the sod-mulch may be economically used, but such orchards are rare indeed. Now and then a home orchard of apples and pears may advantageously be kept in pasture.

### FARQUHAR CIDER PRESS

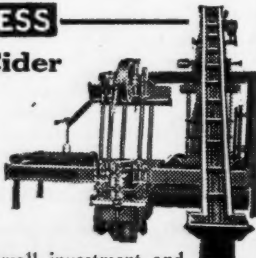
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## Increasing the Profits in Marketing Small Fruits

FEW SMALL fruit growers are satisfied with the returns secured from the sale of their product. Certain seasonal conditions such as unfavorable weather at critical periods during blooming and ripening time as well as unfavorable market conditions are sometimes inevitable. Most other limiting factors constitute problems for the grower to solve and the extent to which he solves them will indicate his profits to a great extent. It may be well at this time to list some of these limiting factors and indicate some of the ways in which profits may be increased in selling small fruits.

In the first place, the grower must raise fruit of good quality. This statement may seem too obvious but evidences of the opposite condition are seen everywhere in exhibits of undersized, misshaped, seedy fruit offered for sale. In growing fruit of good quality, it will be necessary, of course, first to plant quality varieties and then to give them quality care. This involves a careful study of the kinds and varieties best adapted to the locality and the practice of the best cultural methods, such as soil treatment, pruning and spraying, in producing the crop.

In the second place, the grower should advertise his fruit. This may be in one of several ways, depending to some extent, of course, upon the variety or fruit he grows and upon his method of selling. If sold to grocers or commission men, attractive labels should be used. These may either be printed on the package or in the form of stiff paper ribbons, for example, enclosing the individual boxes of berries. The name of the grower if the fruit is especially good will usually be remembered by the consumer the next time he is in the market.

If the grower lives on a paved road, a roadside sign will be much worth while as an advertisement. A roadside market, if the fruit is kept clean and screened from flies and a fair price is asked, will often pay well.

An advertisement in the local newspaper, short and to the point will often do the work. Some sort of a preliminary notice inserted a short time before the season opens to the effect that "Brown's Quality Berries will soon be ripe—wait for details next week," will have its effect.

After the grower has advertised his product as something better than the ordinary, he must naturally deliver the goods. He must know exactly what his public wants and cater to it. If people want black grapes, even though red or white varieties may be superior in quality, it is not wise to plant too heavily of the latter. If late varieties of strawberries do not sell as well as early and mid-season varieties, take the cue from public demand and plant such varieties. If there is little demand for gooseberries and currants, work up a sale for them and increase their planting gradually as need arises.

Every operation connected with the picking, preparation for market and actual offering for sale should be carefully planned out beforehand.

In picking the fruit, a capable and conscientious foreman is absolutely essential. Boys will be boys and have been known to fill baskets partially full of leaves before placing berries in them. Every row must be picked clean, not simply the best sections of

the best rows. While some varieties like the Klondyke strawberry, for example, will hold up in shipment when picked wet, most small fruits will be better if not picked at that time. No fruit should be picked and exposed to the sun. Gooseberries and blackberries suffer most on this account. Gooseberries will be badly scalded in a few minutes and blackberries will dry up and turn red.

The proper time to pick depends, first, upon the fruit and, second, upon its ultimate use. Blackberries are at their best only when allowed to ripen on the vines and eaten at once after picking. They should be grown in a commercial way only within easy trucking distance of the market. Red raspberries are so soft that in addition to being packed in pints instead of quart boxes, they necessarily have a restricted market radius. Strawberries, if picked slightly under-ripe and carefully packed, can, under proper refrigeration facilities, be shipped hundreds of miles with no loss. Gooseberries as commonly picked, hard and green, are easily and safely sent long distances. Eastern and northern grapes, picked and packed according to the rules governing members of the various grape marketing associations, are sent in many directions through most of the northern states. For local market, however, the best quality is secured only when the fruit is allowed to ripen on the vine. Grapes do not finish their ripening process properly if picked early.

Few small fruit growers grade their fruit except to see that no extremely poor berries are included. Sometimes separate boxes are used by the pickers, filling them according to size and general appearance of the berries. It certainly pays to put up a uniform pack and have a fair percentage of big berries in the bottom of the box. Poor packing also has a definite relation to a glut on the market. The grower who puts out only a high quality pack will not suffer so much when a glut does come.

After the fruit is picked and packed, it must be carefully handled on its way to market. Good roads and wagons or trucks with good springs have done much to lengthen the life of small fruits over what it formerly was. The precooling and icing of refrigerator cars for long distance transportation of small fruits would be of no avail unless proper transportation from the fields with the fruit protected from dust and sun was insisted upon.

### Renovating the Strawberry Patch

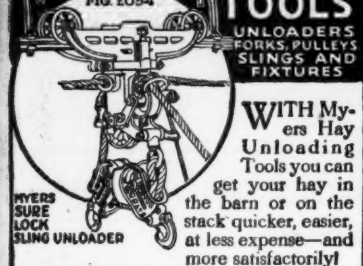
THE NUMBER of crops to be taken from the strawberry bed depends upon the variety grown and the condition of the bed at the end of the first picking season, as regards soil fertility and the presence of weeds. If a variety like the Dunlap is grown, and good care has been given the bed during the first season, it will usually pay to renovate it, thus securing another good crop the next year.

The chief purpose of this renewal is to thin out the older, unproductive plants in the rows and give those that remain the opportunity to produce new matted rows of vigorous, healthy plants.



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The best time for renewal is in early summer, soon after the bed is through fruiting. The crop next year will be directly proportional to the number and size of new plant crowns laid down after renovation this summer. It is wise, therefore, to renovate early, usually in June.

If the mulch is heavy, it must first be removed. The tops of the plants are then clipped off with a sickle, or in large commercial beds they may be mowed off with a machine. If the mulch is light, it may be removed with the leaves, which are raked off after being allowed to dry. The bed is then burned over, on a windy day, preferably after a rain, when the ground is moist. If there is no wind and the plant-crowns are dry, a slow fire may injure them. These operations eliminate many diseases and insect pests.

The next step is to thin out the surplus plants. This is done either with a hoe or plow, depending upon the size of the bed. If a hoe is used, the surplus plants are cut away, leaving a vigorous young plant about every 10 inches in the row. A coat of well-rotted manure spread on and cultivated in with the soil around the remaining plants which have been well hoed will soon induce new runners to start. This is also a good time to apply a thin coat of nitrate of soda, especially if manure is not available. With good cultural methods continuing throughout the season, a new matted row will be formed by the end of this time, capable of producing a larger crop than was produced the first fruiting season.

In a large plantation, either a disk or a turning plow is used to narrow down the original matted row. If the plow is used, two furrows are plowed from one side of each row until the center of the row is reached. The middle space between the rows is then cultivated, the ridges being smoothed down and fresh soil worked in around the narrow strip of young plants. A spike-toothed harrow is then run across the patch with the teeth set with a back slant so as not to tear out too many plants. As was the case during the previous seasons, good cultivation should be practiced from this time on.

## Dusting and Spraying Peaches

(Continued from page 4.)

for these losses is the dreaded brown-rot.

The development of brown-rot depends largely upon proper conditions of temperature and moisture. Relatively low temperatures and the absence of moisture are unfavorable to its development. Fruit becomes more susceptible as it ripens. If conditions are favorable and the fruit is not protected with a fungicide, rot may develop seriously before harvest, but this frequently does not occur. The spores of brown-rot are probably always present, but cannot develop under unfavorable conditions which may prevail so long as the fruit is on the trees, but as soon as the fruit is picked, packed and shipped, conditions may change. The fruit becomes more susceptible to rot as it softens, and conditions of moisture and temperature may become favorable for the development of rot. The result frequently is that fruit which seemed sound in every way reaches market in an unsalable condition.

Fortunately, such losses may be prevented or reduced by proper treatment, and this treatment consists of an application of dust or spray about one week to 10 days before harvest. The material to be used for this application must meet certain requirements. The material to be used for this application, and, second, it must not stain or discolor the fruit. It is understood, of course, that the material must be toxic to brown rot. The material which probably best meets these requirements is sulphur dust. If properly applied the fruit will not be discolored and the dusting method has

an advantage at this time in that the work may be quickly and easily done when there is likely to be a rush of other work.

## Materials and Application

Superfine or dusting sulphur should be used. The ordinary grades of sulphur vary considerably in their physical properties and their fungicidal value has not been well established. Pure dusting sulphur is likely to be a little heavy, so that it does not flow and spread well from the duster. This may be overcome by adding five to 10 per cent of hydrated lime, which will make the mixture more fluffy. Sulphur dust containing five to 10 per cent of what is called a "spreader" may be purchased from the manufacturers of dusting materials. Home mixing is not desirable unless a good mechanical mixer is available.

The material may be applied with a hand duster for a few trees if they are not too large, but for extensive operations, a power duster is necessary. The trees should be dusted from two directions to insure complete covering. The application should be thorough but with as small an amount of material as possible. Excessive amounts of material may discolor the fruit and cause unpleasantness for those who handle the fruit when picked and packed. The material should be applied about one week to 10 days before harvest.

For the growers who do not have a duster available, it is possible to substitute a sulphur spray. This may be made by mixing eight pounds of fine sulphur and eight ounces of calcium caseinate, in the dry form. Add water slowly and stir vigorously until this mixture is worked into a paste that will strain easily into the sprayer tank. Dilute to 50 gallons with water, and for larger quantities, use in the same proportion. The agitator should be running and preferably should not be stopped until the material is sprayed out, as it settles very quickly when still and is rather difficult to get into suspension again. This is also true of the sulphur-hydrated lime sprays suggested for the earlier applications.

Experiments have shown that peaches receiving this late application will stand up in better condition after packing and shipping than will fruit which has not been so treated. This application must not be considered as a "cure-all" but simply as one more step in the treatment necessary to insure satisfactory control of brown rot. The importance of proper summer treatment of peaches in general and of the late application of sulphur dust in particular, was emphasized by the action of a well known co-operative fruit exchange. When paying the growers for their peaches, two pools were made, one for peaches which had been dusted and another for peaches which had not been dusted.

CALHOUN COUNTY is a little county in western Illinois, located on a narrow peninsula between the Illinois and Mississippi rivers. It varies from six to 15 miles in width and is only 35 to 40 miles long.

From time to time reports have been made of the tremendous crops of apples, mainly Jonathans, Grimes and Willow Twigs, produced by Calhoun County, but no exact figures were available, due to the fact that there are no railroads in Calhoun County and the fruit is all shipped out by boat.

In view of these facts, A. J. Surratt and Mr. Dawson of the Division of Crop Estimates, Springfield, Ill., secured complete figures of the shipments last year at considerable work and expense.

This investigation shows that little Calhoun County, which is called the "Kingdom" by its home people, shipped the following quantities of apples in 1923: Barrels—446,487; baskets—65,580; sacks—9500. In addition, 8252 barrels of cider were shipped. These figures indicate that the estimate of 500,000 barrels for Calhoun County was not far from correct.

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## BETTER HOME DEPARTMENT

### Ironing and Ironing Equipment

by E. W. Lehmann

IRONING is one of the hard jobs in the home, and it is a costly job in terms of hours of hard work or in terms of dollars if someone is hired to do it. In many localities in the smaller towns and also in the country, this job for a family of six will cost from three to three and one-half dollars per week, or between \$150 and \$175 a year. Where labor is cheaper, the cost is proportionately less. The cost in terms of labor is the same every place if the mother in the home must do this additional job. The basis for determining the value of equipment is the number of times the equipment will be used during the year and the labor saved each time it is used. Every woman who has to do the ironing realizes the importance of good equipment conveniently placed for use.

The sad-iron is the most common and most important piece of ironing equipment found in the average farm home. It is no doubt called a sad-iron because of the fact that the person who uses it soon has the appearance of one who has some great sorrow weighing on her mind. While wash day is no doubt chiefly responsible for referring to Monday as "Blue Monday," washing with modern equipment becomes a lark compared with the job of ironing with sad irons on a board that is not well supported. Some women enjoy ironing, even under difficulties, because they like to see the clothes take on the freshness of a well ironed garment, but they should not be expected to do such work with equipment that soon makes the job become a drudgery.

Irons might well be classified under two heads, those which are heated and the self-heating type. The chief disadvantage of the type of iron that is heated is that it is not always convenient to heat the irons, and considerable time is always wasted where such an iron is used. Where irons are heated on a stove, the heat is very disagreeable in the summer. Special iron heating buckets make it possible to take the ironing out to a cool place during the summer months.

There is a type of self-heating iron on the market for nearly every fuel available; the most common types are: the charcoal, gas, acetylene, alcohol, gasoline and electric. The self-heated type of iron has the following advantages over the heated type: less fuel is used, it does not heat up the operator as much, it is more convenient, and less labor and time is required to do the job.

The charcoal iron is seldom used because it is not as satisfactory as other types. Where gas is available, the gas iron can be used to advantage. A burner is provided inside the iron and it is heated the same as an ordinary gas stove. After the iron is once hot, its temperature can be regulated by adjusting the gas valve. Care must be observed in operating such an iron to avoid blowing out the flame by the movement of the iron. Where acetylene is used for lights and the acetylene plant has sufficient capacity, ironing can be done with this form of gas. The construction of the burner is slightly different from the ordinary gas burner. Acetylene gas is highly explosive when mixed with air and for this reason care must be observed that none of the gas escapes into a closed room.

The alcohol and gasoline irons are quite similar in construction and in operation. The chief difference is in the fuel used. This type of iron generates a gas right in the iron. For satisfactory use the burner must always be kept free from dirt. The fact that gasoline is a more common fuel than alcohol, it is more often found in use. Either gasoline or alcohol irons are satisfactory and are found in many farm homes. It must be remembered that both gasoline and alcohol are fuels that must be handled with care to eliminate all danger. The same is just as true of the ordinary lamp that burns a liquid fuel. Carelessness on the part of the operator is the greatest cause of accidents.

Electric irons are no doubt the most satisfactory from the standpoint of the average user. Where electric power is available, the housewife can hardly afford to be without an electric iron. It is true, however, that it costs more to operate an electric iron than other types. Where electricity costs 10 cents per kilowatt hour, it will cost about five cents an hour to operate the electric iron. Five cents' worth of gasoline should heat an iron for several hours. For safety, the electric is best.

Care should be observed in handling an electric iron. One should always be careful that the iron does not become overheated, and care must be observed in disconnecting the iron from the circuit. The method of connecting an electric iron to an ordinary socket on a lamp cord and turning the electricity off at the socket switch is not good practice. A little care in handling the iron will result in longer life and a saving of electric energy.

The mangle for ironing is not commonly found in farm homes, but as a labor saver it should be considered as an important piece of home equipment. It is especially desirable for ironing linen and, in fact, all flat work. A finish can be put on a tablecloth with the mangle that cannot be done with a flat iron. The late models of mangles are designed so that most any garment can be ironed on them.

There are two types of mangles, the cold and the heated. There is no comparison as to quality and speed of work done by the two types—the heated mangle is far superior.

Mangles are now being heated with gas and electricity, and for the person who does not have either of these, kerosene or gasoline attachments may be secured. To heat by electricity, the cost of operation is much more than the cost by other methods.

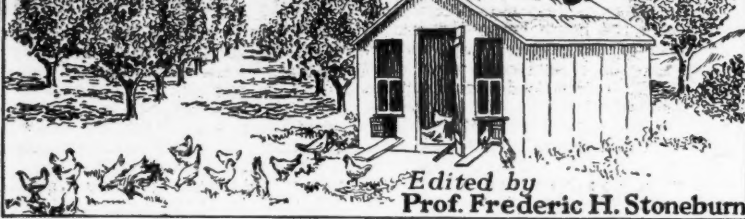
The mangle is rather an expensive piece of equipment and for this reason it should be kept protected at all times. It should also be protected for the same reason a flat iron is protected, to keep it clean and free from rust so it can be used without damage to the fabrics.

Built in and specially supported ironing boards are a great convenience. In planning a new home, the prospective builder can well afford to consider building in an ironing board, also locating a convenient power plug to connect the electric iron and a light for convenience in ironing on a dark day.

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## Profitable Poultry



Edited by  
Prof. Frederic H. Stoneburn

### Head Off These Troubles

ON MOST commercial poultry plants the majority of the pullets intended for the laying flock are past the brooding stage, safely weaned and out on range, by early June. This is especially true of the heavier breeds, as Rocks, Wyandottes and Reds. In the case of the quicker-growing Leghorns, late April and early May chicks will often reach laying maturity by early fall, and many of these are still being brooded.

So on many plants and the majority of general farms, a large proportion of the season's crop of chicks is hatched during May and June. The question of saving and raising these so-called late hatches is of great importance. If these chicks die, the season is too far advanced to permit one to make good the loss.

These late hatches should be given the same management as the earlier ones—as outlined in previous issues—but a few points should be given special attention. Briefly, these are as follows: Grow the late broods on fresh ground which has not been contaminated by the earlier hatches; keep the houses absolutely clean; ventilate freely; fight vermin, especially the red mites; provide a great deal of shade; supply an abundance of cool, clean water; get the chicks out of doors early in the morning so they may feed and exercise then and rest comfortably in the shade during the heat of the day. These simple things will aid in overcoming the bad effects of the hot weather.

As the season advances, three destructive chick troubles will claim attention. These cause untold losses in all parts of the country, but the wise poultryman can avoid or overcome them with relatively little trouble. They are coccidiosis, a germ disease; gapes, due to a parasite; and rose chafers or rose bugs.

Coccidiosis is a disease of the intestinal tract and is often difficult to identify since it has so many symptoms that are also observed in other diseases. It is due to the action of a sporozoa, a microscopic organism that lives in the soil. Early chicks, therefore, frequently avoid it during the brooding stage because they spend much of their time in the houses and are not so freely exposed to infection. When coccidiosis appears among young chicks, it is sometimes confused with white diarrhea. The victim's head is drawn down close to the body, the wings droop, the plumage is ruffled and usually there is a persistent discharge from the bowels. The latter is often light in color, even white, and may contain more or less blood.

The disease, unfortunately, is not confined to young chicks. It may appear in and practically ruin the weaned flocks, which are regarded as being past the danger point. Such losses, after all the trouble of brooding, are particularly distressing.

I know of no dependable remedy. Once heavily infected, a chicken has little or no value even though it manages to survive. If one wishes to try treatment, some little benefit may be secured in the following way: Give a liberal dose of epsom salts to clear out the intestinal tract. Then add to each gallon of drinking water one-third of a teaspoonful of crude catechu, powdered. Use this continuously.

To prevent the infection, one has merely to grow the birds on fresh, uninfected soil, that upon which no poul-

try has ranged for a year or two. This applies to both the little chicks and the weaned birds. This explains why late hatches should not be placed on land used by the earlier broods.

Another trouble due to soil infection is the dreaded gapes. Fortunately, this is confined to the relatively young chicks; the older birds are usually strong enough to resist it. Chicks suffering from gapes sneeze or cough, gape or yawn, at frequent intervals. The afflicted youngsters become gradually weaker, breathe with increasing difficulty, and die. The trouble is due to Y-shaped worms lodged in the windpipe. Some of the worms may be removed mechanically, but this is a trying job.

Infected soil and water contain the eggs produced by the worms, which are thrown off by the sick chicks. These tiny eggs remain alive in the soil for many months. If taken into the body of another chick, the eggs hatch and the worms make their way to the windpipe, where they cling and bring on the symptoms described above.

Here, again, the prescription is clean, uninfected soil. But in some cases one is compelled to use the same land for growing chicks, year after year. In that case, the soil must be cleaned up, disinfected, provided coccidiosis or gapes have appeared on the place. Frequent deep, thorough cultivation and the growing of green crops will probably help.

Some authorities advise drenching the earth with a one per cent solution of sulphuric acid. Prof. Aubry, late of the New Jersey College of Agriculture, recommends the applying of ground crude sulphur (commercial flour sulphur) at the rate of 1000 to 2000 pounds per acre. If one uses sulphur inoculated with cultures of sulphofying bacteria, the action will be quicker. Work the sulphur all through the soil.

This large amount of sulphur will make the soil extremely acid, with consequent destruction of germs and parasites. It will also kill practically all plant growth. After the disinfection is complete, the soil should be sweetened by applying two pounds of burned lime or three pounds of ground limestone for each pound of the sulphur used. So treated, the land will be highly fertile and grow big crops.

The pesky rose bug which is so common during certain seasons, especially on fruit farms, is another chick-killer. It is most dangerous to young chicks, becoming less so as the youngsters gain in age and strength. In former years we often noticed that lots of chicks died during the rose bug season, with crops and intestines packed with the bugs. While quite sure that the latter were responsible we thought that the deaths were due to mechanical action of the hard shells and claws. As a matter of fact, the bugs secrete a poison, a neuro toxin, which kills the little birds. One may crush a bunch of the bugs and give the juice to the chicks, and the latter will die.

It is an almost hopeless task to attempt to fight the rose bugs, and since we apparently cannot keep the bugs away, we must arrange to keep the broods of young chicks away from the bugs. As the latter collect on thick shrubbery, bushes and vines, and are not often found on close-clipped pastures, or meadows or on bare ground, such places offer safe refuges for the chicks.

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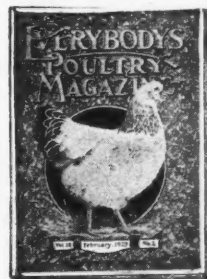
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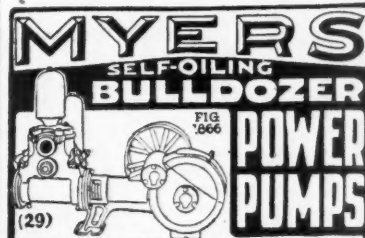
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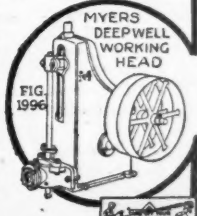
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## How to Secure a Maximum Crop of Honey

by H. F. Wilson



Three hive bodies with brood in every one of them just before the honey flow.

**PRIMARILY** people who keep bees are interested in securing a crop of honey, and it is rather easy to secure some surplus. However, not more than 20 per cent of the beekeepers in the United States are getting anything like a maximum crop of honey. The average production for the entire United States is less than 20 pounds per colony.

On the other hand, individual bee-

you may be sure that the honey flow has started.

If you are planning to produce extracted honey only, no special attention need be paid to individual colonies. But, if you wish comb honey, then the stronger colonies should be selected. If the colonies are in single story hives at the beginning of the honey flow, put on a queen excluder and two empty supers with drawn combs or foundation if the combs are not available. Do not fail to use full sheets of foundation in all frames. Then keep watch to see that each colony always has the space of at least one full time body for ripening room. When the nectar is first brought in from the field it is scattered about in empty cells until nearly ripe, when it is gathered up and put in the storage cells and sealed over. If the brood chamber consists of two stories at the beginning, then go through each colony, select out the unsealed brood and place in the lower part, putting the sealed brood in the upper story. Find the queen and put her in the lower hive body and put on a queen excluder at the other story to one side, putting on two extracting supers above the excluder. Then on top of these set the second story with the sealed brood. Examine each colony again in seven days and destroy all queen cells. Under normal conditions this is all that will need to be done to prevent swarming. In follow-



At the beginning of the honey flow. Plenty of room for ripening and storing honey insures bigger crops.

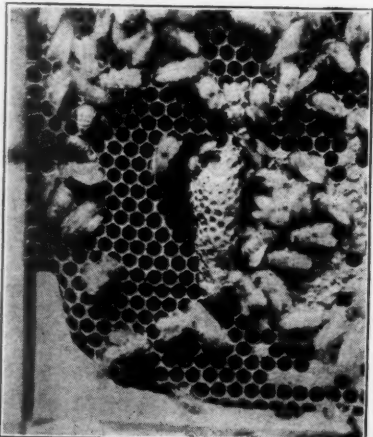
keepers in only fair localities are getting an average of 100 pounds or better per colony each season, and other beekeepers in more favorable localities are getting even higher averages.

Now the question is, why do these conditions exist? The answer is that it is just the difference between expert manipulation and poor manipulation of the colonies previous to and during the honey flow. It really is not more difficult to handle bees properly than it is to handle them poorly. If the right thing is done at the right time, maximum results can be secured. There is nothing mysterious about the care of bees and good practical information based on known facts is available for everyone. In previous articles we have discussed fall management, winter care and spring care of bees. If the care previously recommended has been followed and the manipulations now given are attended to, a maximum crop for any locality can be secured.

We will suppose that at the beginning of the honey flow there were from 12 to 20 pounds, or 75,000 to 100,000 bees, in each colony. A colony with this number of bees will be boiling over and they should have two hive bodies. There are two ways in which the beekeeper can determine the beginning of the honey flow. First, if the bees are going and coming with a steady hum and are not idling around the entrance of the hive, there is, undoubtedly, some honey coming in. Then if in examining the colony new wax is being formed, either as cells or on the tops of the frames

ing this method, the bees have four stories to work in and only in exceptional seasons will it be necessary to add more supers.

The top hive body, which is really a part of the brood chamber, will be filled with honey as fast as the bees hatch from the cells. When this hive body is full and sealed over, it can be set to one side as reserve stores for fall and winter feeding. The honey stored in the other hive bodies may be extracted as soon as the cells are sealed over or may be left until the end of the season and all extracting done at once.



The need for cutting out queen cells can be greatly reduced if two-story hives are used.

If comb honey is to be produced, select out the combs in the same manner, choosing combs as much as possible which have brood clear to the top bar, in order to keep more direct contact with the comb honey supers. If increase is desired, the upper hive body may be placed on a new stand and the bees permitted to rear a queen as in a normal colony. If increase is not desired, arrange the colony to one side of the original hive facing sideways from it. Put a queen excluder on the main hive body and put on two comb honey supers. It is not advisable to start with more than this number, and if only one is used at the beginning the bees will not accept it as readily as the two. The bees will probably work in the bottom one first. As soon as they have a good start in this one, reverse the two, putting this one on top. Then the bees will continue to work in the upper super and will also start to work in the lower one. If the honey flow is rapid, as soon as the upper super is about two-thirds filled, add a third comb honey super just above the queen excluder. As soon as any of the supers have the sections well sealed, remove from the colonies. Do not permit the honey to remain on the hives longer than is necessary to have them well capped, as the sections will become dark and propolized if allowed to stay on too long.

### Preparing for Next Year.

Keep in mind at all times that young queens not more than two years old are 50 per cent more efficient than old queens; also that young bees in the fall means young bees in the spring and there must be bees in the spring to rear more bees for the honey flow or else we fail to get a crop. Requeen in July or before the middle of August.

## Shall the Apricot Grower Hand-thin His Fruit This Season?

by Warren P. Tufts  
University of California

**THE APRICOT** grower will not soon forget the disastrous season of 1923 when with the largest crop on record both cannery and dried fruit prices were such that in most instances the fruit did not bring returns sufficient to pay for the labor of harvesting.

It is perhaps somewhat too early to forecast the probable crop and returns for this season, however the thoughtful orchardist will now be deciding if he can afford to "hand thin" his apricots. Apricot growers in those districts who on account of favorable locations can profitably ship their fruit to eastern markets, will not hesitate a moment in their decision. They know that by hand thinning they secure the large fruit which brings the best returns and that it is not unusual for a five by five pack to average a dollar more per crate than the next smaller size, the five by six pack.

The man who is dependent upon the cannery and dried fruit market as an outlet for his fruit cannot decide so easily. The experienced grower will undoubtedly have attempted to limit his crop by his pruning methods to that which the trees under the given soil and moisture conditions can bring through to acceptable size. In a favorable season, however, more apricots will set than the tree can properly size, no matter how skillfully the pruning may have been done. If the fruit is "clean"—no shot-hole fungus, fog marks, etc.—recourse may be had to thinning with the aid of a light pole. This method neither gives the most desirable distribution of the fruit nor the opportunity to select between "clean" specimens and inferior ones, as does hand thinning, its greatest advantage being the cheapness of the operation. It is preferable, however, to thin in this manner rather than not to thin at all.

Details with regard to the hand thinning of deciduous fruits are contained in Circular 258 of the California Agriculture Experiment Station, which may be obtained upon application to

the Director of the Agriculture Experiment Station, Berkeley, California.

## Spray From the Ground

**IT IS** extremely difficult to control aphids on apple trees by spraying unless a systematic method is followed in spraying each tree. In experiments conducted in apple orchards in western New York by the entomologists of the New York Experiment Station at Geneva, N. Y., it was found that when spraying was done from the top of the spray tank the results were quite uncertain, due to the fact that the insects congregated on the lower branches of the trees where the spray mixture failed to reach them. At the same time, in orchards where the station spray system was followed, in which the spraying was done from the ground and under the trees, practically complete control of the pests was accomplished.

In the station method, the spray outfit is equipped with a sufficient length of hose to enable the nozzle-man to work from the ground and under the tree. He then takes up certain designated positions in spraying each tree which insure the spray mixture reaching the underside of every branch and twig. By moving from place to place and by maintaining a pressure of at least 200 pounds at the spray tank, it is claimed that each tree can be completely covered in a relatively short time. The station tests and spray system are fully described in Bulletin 487 which may be obtained from the station free of charge.—New York Experiment Sta.

### Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of August 24, 1912.

of American Fruit Grower Magazine, published monthly at Chicago, Ill., for April 1, 1924.

State of Illinois, County of Cook, ss.—Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Walker, who, having been duly sworn according to law, deposes and says that he is the business manager of the American Fruit Grower Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

Publisher—Magazines, Inc., 53 W. Jackson Blvd., Chicago, Ill.

Editor—None.

Managing Editor—C. E. Durst, 53 W. Jackson Blvd., Chicago, Ill.

Business Manager—H. W. Walker, 53 W. Jackson Blvd., Chicago, Ill.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent or more of the total amount of stock should be given.)—A. Tupper, J. E. Montgomery, I. A. Sisley, S. Adams, H. W. Walker, et al., 53 W. Jackson Blvd., Chicago, Ill.; E. G. K. Meister, 501 Arcade, Cleveland, O.; C. W. Price, 15 Park Row, New York City.

3. That the known bondholders, mortgages and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none, so state.)—None.

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HARRY W. WALKER,  
Business Manager.

Sworn to and subscribed before me this

22d day of March, 1924.

(Seal.) A. C. Bamberger,

Notary Public.

(My commission expires Aug. 6, 1925.)



for June, 1924

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## Characteristics and Control of Chicken Lice and Mites

by H. A. Bittenbender

**DURING** the spring and summer months practically every poultryman is confronted with the problem of satisfactorily controlling lice on his chickens and mites in the chicken house. It is not an easy matter to control lice and mites, but with consistent application and the use of the proper materials, it is not a difficult problem. Without doubt, a few statements in regard to the characteristics of both lice and mites will aid everyone in controlling them.

Fowls infested materially with any of the external parasites will not remain profitable for any length of time. It is a difficult matter to keep the flock absolutely free from body lice and mites; oftentimes many kinds of the insect pests, when in enormous numbers, cause the death of the infested bird. In many instances, it has been found that a flock is unprofitable because of the large number of external parasites present. In order to keep the parasites sufficiently in control so that the health of the flock is not impaired, it is well to know something of the life history and habits of these pests.

Among the more common external parasites frequently found on infested birds are lice, mites, fleas, air-sac mites, chicken bugs, chicken ticks and ring worms.

### The Chicken Louse

**Description and Habits**—Lice are a group of biting insects. Their bodies are flat and slender. Their mouth parts are arranged for biting. They live upon the secretions of the body, epidermis and feathers. They are pale yellow or gray in color and about one-twentieth of an inch in length. The body and legs are more or less covered with bristles, which enable them to hold onto their host.

**Varieties**—Each kind of bird has its own peculiar lice, which live upon that particular kind of bird and no other, with possibly now and then an exception. On chickens the two most common distinct varieties are (1) the large head louse of chicks (Menopon kiseriartum) and (2) the body louse of chickens (Menopon pallidum).

The female louse is a trifle larger than the male. Lice multiply or propagate by laying eggs, often called nits, which are oval in shape and white in color. They are attached to the barbs of the feathers by the female through a peculiar cementing process with which she is provided. Lice multiply very rapidly in hot weather, at which time they find conditions most favorable. One pair of lice under the most favorable conditions may possibly be grandparents to over 100,000 descendants in a period of two months.

Lice spend most of their time on the fowl, although occasionally on the nest. The eggs or nits are found on the barbs of the down feathers of the fowl, especially around the vent.

**Symptoms**—The young are very active and commence to irritate their hosts at once. Large numbers interfere with the health, growth and development of the bird, as well as egg production and fattening.

A lousy bird will scratch and pick its feathers. It may refuse to eat and show signs of drowsiness. Young chickens infested with an abundance of lice will sit around, mope with wings hanging down, head becomes pale and indicates a lack of vitality; usually in 12 days to two weeks they die. Sitting hens that are lousy will oftentimes desert their nest. The comb turns dark in color, they become emaciated and eventually may die from the effects of the abundance of lice. Germs of diseases may be transmitted by lice as well as other biting and blood-sucking parasites.

It is comparatively easy to locate lice on a lousy hen. Part the feathers in the fluff, near the vent and under the wings. The lice will be observed

close to the skin running in different directions. The large head louse is confined to special regions of the body. Although capable of crawling, it is usual for them to remain stationary, sometimes with the head buried in the skin and the body erect.

**Treatment**—If the large head lice are found upon the heads of the young chicks, it is a good policy to grease the top of the heads with plain vaseline or lard, or one part kerosene and two parts of lard and vaseline. Great care should be exercised not to apply too much. A very small amount is sufficient to close the breathing pores of the lice and kill them by suffocation.

The body lice spend their entire life on the fowl. Therefore, it is necessary to apply the treatment on the fowl. The poultry house, however, should receive a thorough disinfecting. The two most common methods of controlling the lice on the fowls is by treating them with a powder and a paste or ointment. Dipping chickens is not a good practice since it may lead to serious complications in the form of colds and other troubles of the respiratory tract. Dusting the hens with a good louse powder has always been a common practice. There are a number of good powders on the market, but most of them are too expensive for a large number of fowls. A home-made powder can be obtained that will prove satisfactory and inexpensive.

### Louse Powders

One part of stock dip or crude carbolic acid and three parts of gasoline.

Mix together and add as much dry cement or plaster paris as the mixture will moisten. Allow it to dry and apply liberally to fowls.

**Sodium flouride**—Sodium flouride can be purchased at almost any drug store. There are two satisfactory methods of application. First, the pinch method, where a small amount of the powder is applied dry at the base of the wings and in the fluff. The second method is that of dip. Use one ounce of sodium flouride to each gallon of water. In dipping chickens, several precautions should be taken. A dry, sunny, warm day should be selected. The water should be somewhere near the temperature of the chicken. The birds should be immersed in the water and drawn through the water in such a manner that the water reaches the base of the feathers and comes into contact with the skin of the bird in order that the dip may reach all parts.

**Ointment**—One part vaseline and one part blue ointment or mercurial ointment.

Apply amount size of pea under wings and around vent, being sure to get it near the skin.

### Mites

There are many kinds of mites affecting poultry, the most common among them being the chicken mite or the red mite (Dermanyssus Gallinae.) It is about one-twentieth to one-thirtieth of an inch in length. It is broader in proportion to its length than the chicken louse. The mite is naturally gray in color with dark spots. After it has infected a fowl, it becomes gorged with blood and takes on a reddish appearance. This is why it is called the red mite. This insect has sharp mouth parts which are inserted into the flesh of the fowl at night. As a general rule, the mites attack the birds at night when they are on the roosts. During the day they will return to the cracks and crevices in the house. The mites are generally found around the roosts and nests. They deposit their eggs in the cracks, crevices and filth around the building. In the winter time, the mites will become very

## Is Seeing Believing?

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Yours,  
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Be that as it may, "seeing is believing" with us just as it was with Mr. Fischler. Thousands of letters from pipe smokers are visual proof to us that in Edgeworth we are producing a tobacco that most men like.

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active. The eggs hatch in a few days. In hot weather they multiply at a tremendous rate.

**Symptoms**—When a bird becomes badly infested with mites, it causes an anemia, or loss of blood. The bird can secure no rest day or night and finally succumbs. Hens that are setting oftentimes leave their nests; laying hens will stop laying. In certain instances fowls will succumb on the nest or will be found dead under the roost due to the ravages of this pest.

**Treatment**—To eradicate the mites, the chicken houses must be thoroughly cleaned and kept clean. Then the house should be sprayed with a good disinfectant. When spraying the hen house for mites, it is important to remember that the mites have laid eggs and even though the living mites are killed, the eggs may not be affected by the spray. The house should be sprayed twice or three times at short intervals of three or four days. Another point to remember is to give the house a thorough spraying. The task should not be half done by all means.

Some reliable mite exterminators commonly used are as follows:

**Mixture No. 1**—(Spray) Three parts kerosene and one part crude carbolic acid; or (Paint) one part crude oil and one part crude carbolic acid.

**Mixture No. 2**—Equal parts kerosene and gas drips. Gas drip is the by-product from a gas plant.

**Mixture No. 3**—Three parts kerosene and one part cresol or one part stock dip.

**Mixture No. 4**—Equal parts of creosote, water gas tar and crank case drainings. Apply with paint brush or spray.

**White Wash**—Slake one peck lime and dilute with 40 gallons of water. Add two pounds of salt and one gallon of stock dip. Apply with spray pump.

**Government White Wash**—One-half bushel unslaked lime. Slake with warm water and cover during the process to keep in steam. Strain the liquid through a fine sieve or strainer; add a peck of salt, previously dissolved in warm water, three pounds of ground rice boiled to a thin paste and stir in boiling hot 1.2 pounds of powdered Spanish whiting and one pound of glue, which has been previously dissolved over a slow fire. Add five gallons of hot water to the mixture, stir well and let stand for a few days covered from the dirt. Apply with a brush while hot. One pint will cover a square yard.

## Lime Materials for Soil Improvement

(Continued from page 8.)

the United States. A recent report of the United States Geological Survey gives the average cost of finely ground limestone for soil improvement as \$1.49 per ton, while the cost of the burnt lime was \$5.95 per ton, a very material difference in price. To these prices must be added the freight rate and the cost of distribution. Some recent figures of the lime association indicate that it cost \$1.40 per ton to ship limestone 200 miles and that it cost \$2 to ship burnt lime the same distance. Estimates are also made that it costs \$1.20 per ton to haul from the railroad station to the farm. When limestone is burnt in the production of quick lime, it loses approximately two-fifths of its weight by the escape of the carbonic acid gas into the atmosphere. There is therefore less material to handle and pay freight on when burnt lime is used per unit of effective material. The man who uses burnt lime therefore saves money on freight and labor, two important elements entering into the cost of production. But, does he actually save money?

A ton of limestone having a purity of 90 per cent would weigh only 1208 after burning, i. e., the 1208 pounds of burnt lime would have the same value for soil improvement as would one ton of finely ground limestone from the same source. With this data available, it is possible to determine the comparative cost of equal values

of each material as delivered to the farm:

	2,000 lbs. of lime- stone	1,200 lbs. of burnt lime
Initial cost of material	\$1.49	\$3.57
Freight	1.40	1.20
Wagon haul	1.20	.66
Total cost	\$4.09	\$5.43
Excess cost per unit of burnt lime		1.34

These calculations clearly demonstrate that the finely ground limestone is the most economic form for use for soil improvement and that the freight and labor cost of handling the extra weight in the ground limestone is more than offset by its lower mine cost.

## Limestone Helps to Produce an Abundant Cover Crop

Finely ground limestone should be used by the orchardist only for the purpose of assisting in the production of an economic cover crop where difficulty is found in securing one. It has been clearly demonstrated that in many instances nitrogen fertilization is very profitable to the orchardist. The cheapest and most effective source of nitrogen to the orchardist is that obtained by himself by aid of a legume cover crop, such as red clover, hubam clover, sour clover, soybeans or cowpeas, etc. The orchardist will find the use of limestone of very material benefit in producing an abundant cover crop, rich in nitrogen, for fertilizing his orchards.

Ground limestone should be used at the rate of 1000 pounds to one ton per acre, depending on the nature of the cover crop grown and the kind of soil. It must be broadcasted over the surface of the soil either by shovel or lime spreader, depending again largely on the area to be treated, and thoroughly worked into the soil by the ordinary methods of cultivation, such as plowing, harrowing, disking, etc.

The use of finely ground limestone for soil improvement for the better production of a suitable cover crop will be found to be a very profitable proposition by many orchardists whose orchards are located on acid soils. The application of ground limestone to soils which are deficient in limestone is a practical, paying proposition. Limestone ground so fine that it all will pass through a one-fourth inch mesh is the cheapest and most economical form to use. It may be either high calcium or dolomitic limestone. Under some conditions the latter may be the most desirable form to use.

## Are Insects and Diseases Changing in Virulence?

(Continued from page 4.)

perpetuating the species, for the competition of the more susceptible lines would be removed by the lime sulphur. The appearance of "sports" of increased resistance to lime sulphur may, therefore, be another means of accounting for possible changing virulence of insects and diseases.

San Jose Scale has been taken only as an example with which to explain the principles involved. The same things could happen with regard to every insect and disease of fruits.

Another factor which should be kept in mind is the rigid selection that is applied in such matters by our methods of treating insects and diseases. If any hereditary lines of "sports" existed which possessed increased resistance, they would have a far greater chance to perpetuate the species than the less resistant lines, which would largely be destroyed. In fact, it seems doubtful if any plant or animal breeder could devise a system of selection which would be more rigid than that applied in such cases by our practical methods of treating fruit insects and diseases.

That insects and diseases may develop increased resistance to spray materials is supported by evidence from either plants or animals. As is well known, many people have developed the ability to withstand doses of opium and other stimulants that would

be fatal to ordinary individuals. A number of organisms have, under experiment, been made to develop greatly increased resistance to poisons, heat, cold, etc. However, it is not conclusively proved that such developments are inherited.

In some of our annual plants, great advances have been made in developing strains resistant to certain plant diseases. After a few years, some of these strains have become less resistant even though selection for resistance has been continued. Some pathologists have explained such matters by assuming that strains of fungi of increased virulence have developed, in fact, in the case of some plant diseases, different strains of fungi have been isolated which have shown marked differences in virulence.

In this connection, it is interesting to note the Petroleum Fly recently reported by D. L. Crawford of Leland Stanford University. The larvae of this fly are able to live in pools of crude oil, in fact, this seems to be a common abode. Since this fly has been reported only recently, it seems that it may have arisen by "sporting" from another hereditary line.

A man who stands high in plant pathology told me recently that in his opinion apple blotch is more virulent than it was a number of years ago. I have discussed the question with our family physician, several plant breeders, and an entomologist, and each of them is of the opinion that changes in virulence are reasonable from a scientific point of view.

No definite conclusions can be reached on the subject at this time. From a scientific standpoint there are no serious obstacles to the gradual development of greater virulence by our fruit insects and diseases. Such changes, if they occur, probably take place slowly, although in view of the large numbers of insects and diseases and their rapidity of multiplication, it seems possible that changes might occur which would in a few years produce appreciable differences. Changes of this kind may account for our finding after a few years that a spray material which at first gave apparently excellent results, is not as good as we first thought, thus making necessary occasional changes in spray materials. The subject is a most interesting one and affords excellent material for investigation by some good scientific horticulturist. It seems that the subject is one which would lend itself well to experimentation. No doubt, some one could, through investigation of this matter, secure information that would be extremely valuable both from a practical and technical standpoint.

## Buy Only First Class Trees

by Agnes Hilco

YOU WILL often be tempted to save a little money by giving your order for two-year-old trees of smaller size than first class two-year-old trees because you figure it does not take them long to make the additional growth; and if the smaller tree was a one-year-old first class tree this would be true, but in the smaller tree of the same age there is a reason for its being smaller and this reason, and not the size of it, makes it the tree you do not want. If it could not make the grade the first year, the chances are it never will, and of course it is always getting farther behind. Sometimes it is a poor root system that causes it to grow slowly, sometimes diseased conditions of the roots, but whatever the cause, it is best to leave the second grade trees alone, and always buy by the age, and not the size, for a two-year-old tree the size of a three-year-old is worth very much more.

AMOS TUCKER is the new president of the South Haven (Mich.) Fruit Exchange. G. G. Squire, for many years a local buyer and shipper of fruit, succeeds David Woodman as manager.